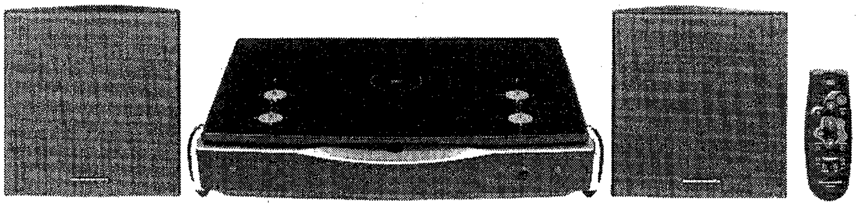
# Service Manual

## 74 MR2020 /2G (Layla)
## MR2020 F,K,KK,U
## CD/Tuner System



COMPACT
disc
DIGITAL AUDIO

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LS2021 ( Speaker System )

1 EXPLODED VIEW AND PARTS LIST ........ 1-1

## CAUTION

The System MR2020 (Layla) combines MR2021 (CD/Tuner Amplifier) with LS2021 (Speaker System).

## 注意

MR2020 は MR2021(CD/Tuner Amplifier) と LS2021(Speaker System) を組み合わせたセット名称です。

Please use this service manual with referring to the user guide ( D.F.U. ) without fail.
修理の際は、必ず取扱説明書を準備し操作方法を確認の上作業を行ってください。

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## system MR2020 / Layla

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First Issue 1999.01
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## SHOCK, FIRE HAZARD SERVICE TEST :

**CAUTION :** After servicing this appliance and prior to returning to customer, measure the resistance between either primary AC cord connector pins ( with unit NOT connected to AC mains and its Power switch ON ), and the face or Front Panel of product and controls and chassis bottom.

Any resistance measurement less than 1 Megohms should cause unit to be repaired or corrected before AC power is applied, and verified before it is return to the user/customer.

Ref. UL Standard No. 1492.

In case of difficulties, do not hesitate to contact the Technical Department at above mentioned address.

PCS 99 955

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# 1. TECHNICAL SPECIFICATIONS

## FM Tuner

| | |
|---|---|
| Frequency range | 87.5 ~ 108.0 MHz |
| F only | 76.0~ 90.0 MHz |
| Sensitivity | 21.2 dBf / 3.2 µV |
| S/N (Mono/Stereo) | 75 / 43 dB |
| F only | 70 / 50 dB |
| THD (Mono/Stereo) | 1.5 / 1.5 % |

## MW Tuner

| | |
|---|---|
| Frequency range | 531 ~ 1602 kHz |
| U only | 530 ~ 1700 kHz |
| Sensitivity | 500 µV / m |
| /2, F only | 400 µV / m |
| S/N | 50 dB |

## LW Tuner [ /2 only ]

| | |
|---|---|
| Frequency range | 153 ~ 279 kHz |
| Sensitivity | 1800 µV / m |

## Amplifier

| | |
|---|---|
| Music power | 25 W + 25 W (4Ω) |
| Input sensitivity (AUX) | 310 mV / 47 kΩ |
| S/N (AUX) | 85 dB |

## CD Player

| | |
|---|---|
| Channels | 2 channels |
| Frequency response | 20 ~ 20,000 Hz ± 3 dB |
| S/N | 82 dB (1000 Hz) |
| THD | 0.04 % (1000 Hz) |
| Output level | 2 V RMS |

## General

| | |
|---|---|
| Power supply | |
| /2 version | AC 230 V, 50 Hz |
| F version | AC 100 V, 50Hz / 60 Hz |
| K version | AC 110V / 220 V, 50Hz / 60 Hz |
| KK version | AC 220 V, 60 Hz |
| U version | AC 120 V, 60 Hz |
| Power consumption | 25 W |
| Power failure backup time | APPROX. 15 min. |
| Dimensions | 450(W) x 104(H) x 308(D) mm |
| Weight | 5.8 kg |

## Table top Speaker LS2021

| | |
|---|---|
| Speaker | |
| Mid-bass | 4" |
| Dome tweeter. | 3/4" |
| Input power | |
| Rated | 25 W (6Ω) |
| Max. | 40 W (6Ω) |
| Frequency response | 80 ~ 20,000 Hz ± 6 dB |
| Dimensions | 190(W) x 200(H) x 100(D) mm |
| Weight | 1.5 kg |

Design and specifications are subject to change without notice.

## 2-1. HOW TO DISASSEMBLE

### 1. Take the bottom case (001G) apart

(1) Turn MR2021 upside down with the jig (Parts No.*MR2021JIG). Take care that the top panel will not damaged, especially 4 levers (Refer to fig.1, fig.2 and fig.3). If you don't have the jig, you prepare to put some magazine or telephone guide under the MR2021 (The height is over 3cm books).

## 2-1. 分解方法

### 1. ボトムケース(001G)の外し方

(1) MR2021専用治具(Part No.*MR2021JIG)を使用し、セットを裏返しにします(図1～3)。もし、専用治具がない場合は、厚さ3cm以上の雑誌や電話帳を置き、それをセットのレバーがまたぐように、セットを裏返しに置きます。このとき、トップパネル面を傷つけないように、ミラーマットや布等を間にはさんでください。

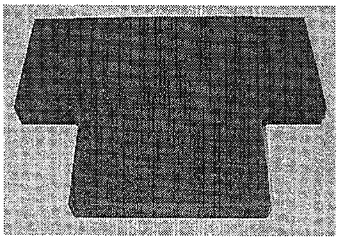


Fig.1 A jig for MR2021

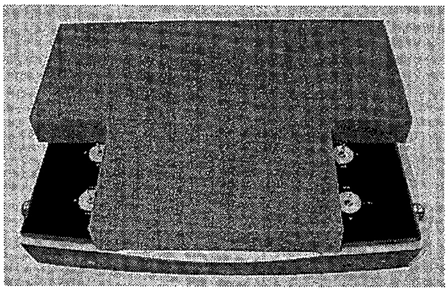


Fig.2 The jig on MR2021

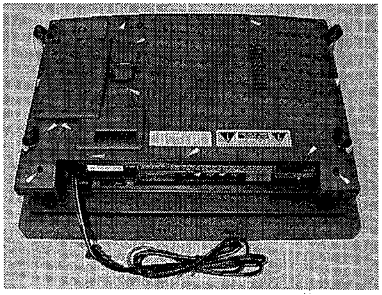


Fig.3 Turning over the MR2021 with the jig

(2) Remove 15 screws as shown in fig.4.

(2) 下図4に示す15本のネジを外します。

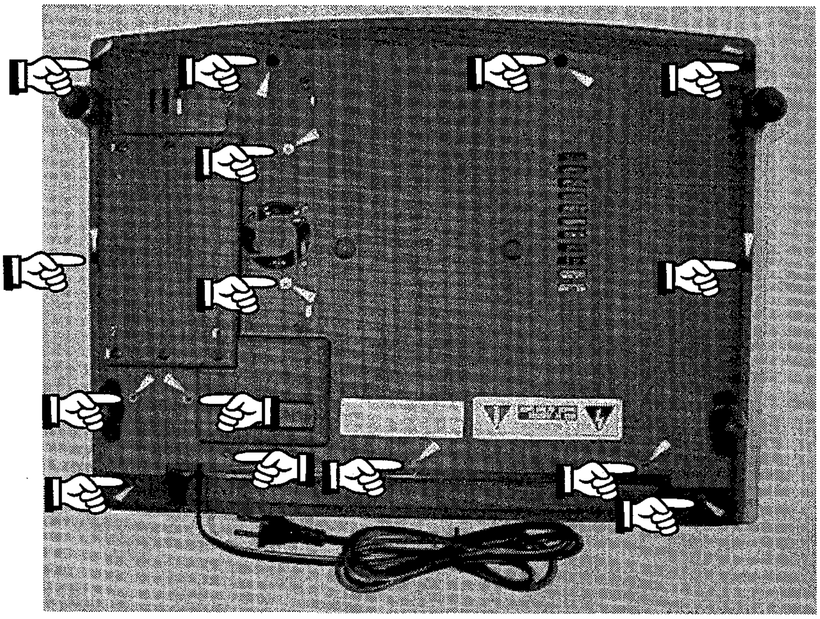


Fig.4 Position of 15 screws

(3) While lifting the bottom case, remove the rear panel as shown in fig.5 and fig.6.

(3) 下図5の様にボトムケースを持ち上げ、リアパネルを外します(図6)。

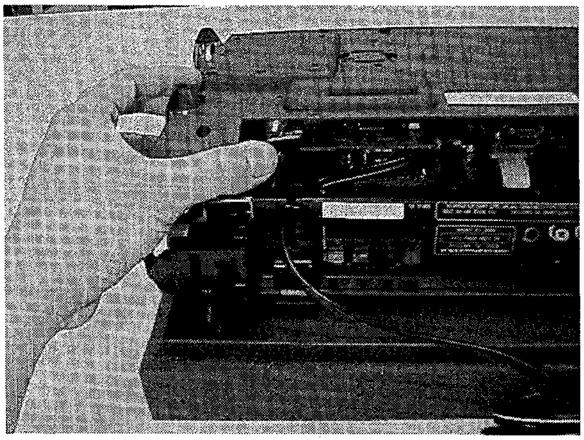


Fig.5 Lifting the bottom case

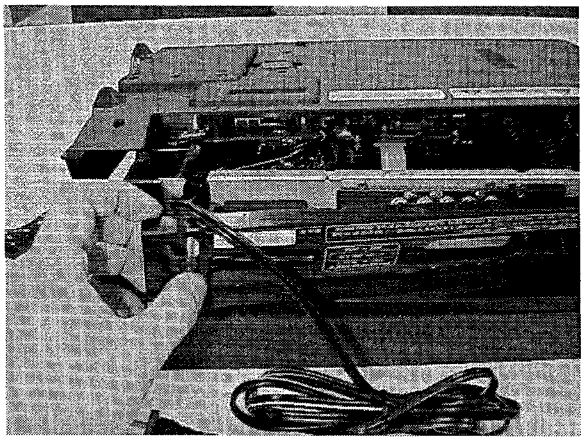


Fig.6 Removing the rear panel

(4) Remove the mains code bush as shown in fig.7.

(4) ACコードブッシュを外します(図7)。

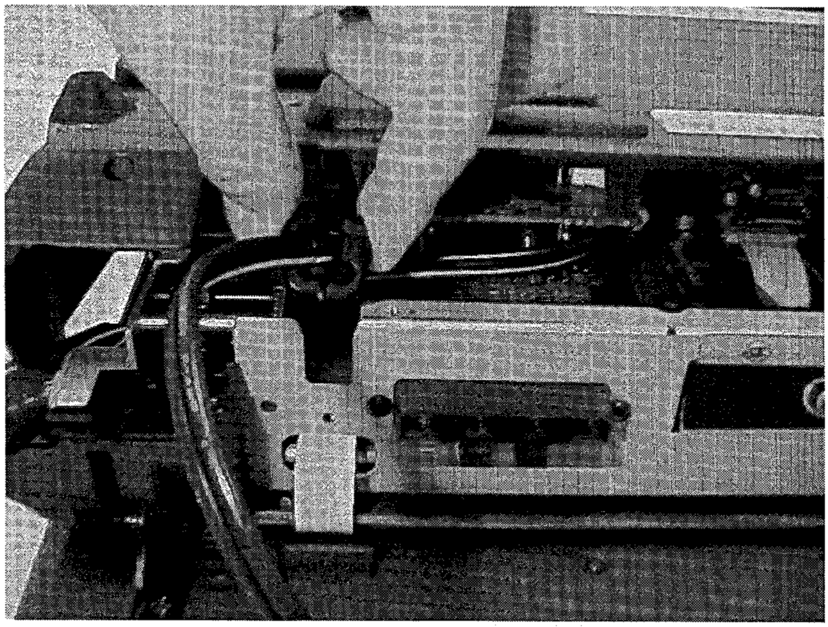


Fig.7 Removing the mains code bush

(5) Lift up the bottom case, put the one with turning to front side (Refer to fig.8).

(5) ボトムケースを持ち上げ、フロント側に反転させながら置きます(図８)。これで、ボトムケースが外せました。

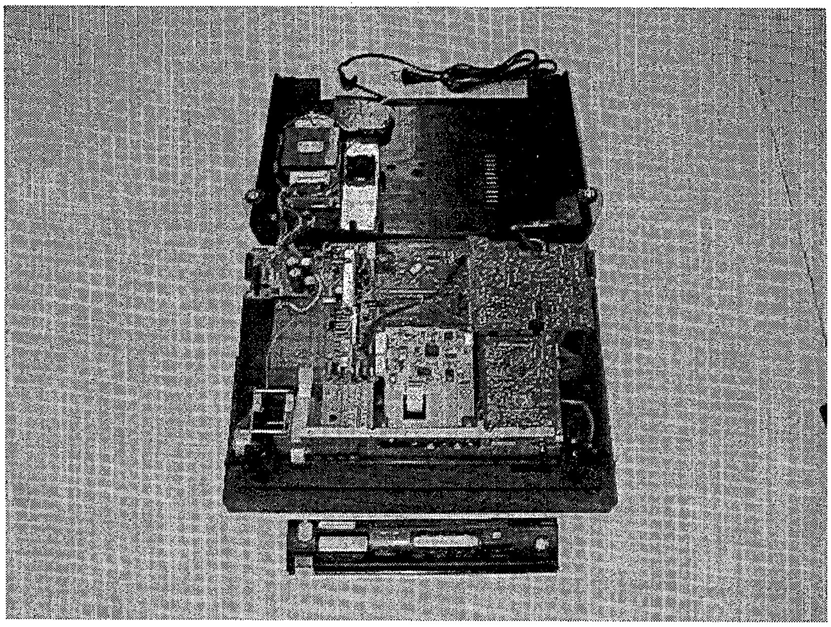


Fig.8 Taking the bottom case apart

**Remark for reassemble**

When you fit the bottom case, remove the lid of the bottom case (Refer to fig.9) and confirm the arrangement of lead wires for transformer (Refer to fig.10).

**組立時の注意**

組立の際は、ボトムケース底面の蓋（図９）を開け、トランスのリード線がきちんと整形されているか確認して下さい(図１０)。

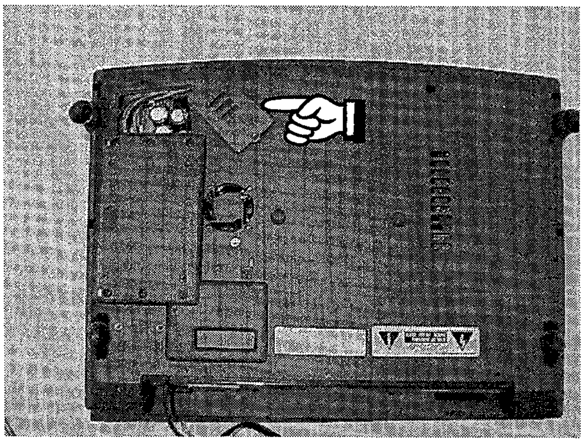


Fig.9 Removing the lid of the bottom case

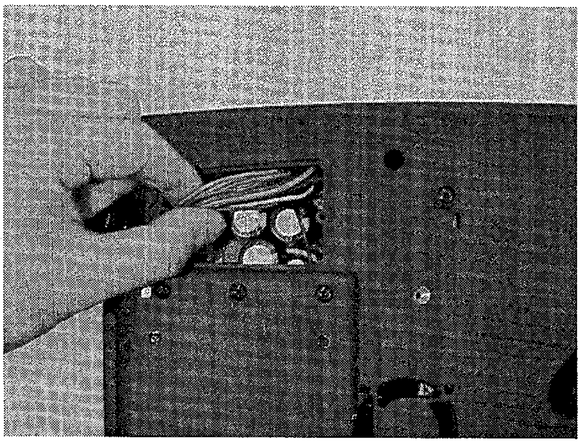


Fig.10 Arrangement of lead wires

### 2. Take the top panel (001D) apart

(1) Turn MR2021 upside down with the jig (Parts No.*MR2021JIG). Take care that the top panel will not damaged, especially 4 levers (Refer to fig.1, fig.2 and fig.3). If you don't have the jig, you prepare to put some magazine or telephone guide under the MR2021 (The height is over 3cm books).

(2) Push the rear panel while holding the top panel (see fig.11 below). The top panel will move approx. 5mm (fig.12 and fig.13). Now, 4 screws on the top panel will become accessible (fig.14). Remove these screws (M3 type screw).

### 2. トップパネル(001D)の外し方

(1) MR2021専用治具(Part No.*MR2021JIG)を使用し、セットを裏返しにします(図1～3)。もし、専用治具がない場合は、厚さ3cm以上の雑誌や電話帳を置き、それをセットのレバーがまたぐように、セットを裏返しに置きます。このとき、トップパネル面を傷つけないように、ミラーマットや布等を間にはさんでください。

(2) 次に、トップパネルを押さえながら、リヤパネルをフロント側に押すと、5mmほど動き、M3皿ネジ4本見えてきますので、これを外して下さい(図11～14)。

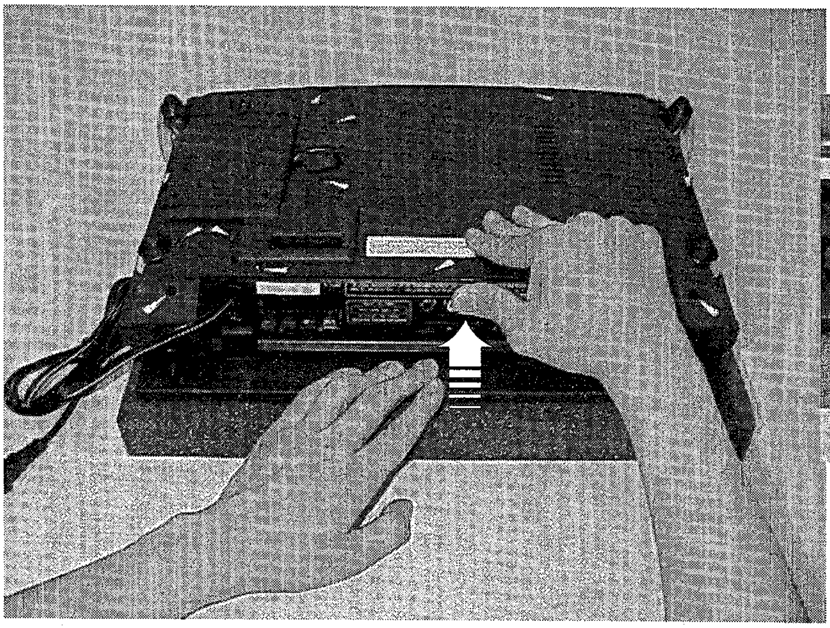


Fig.11 Pushing the rear panel

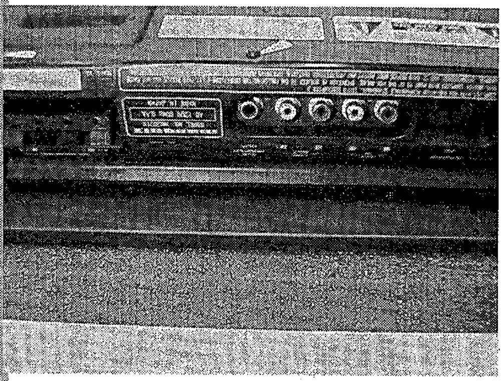


Fig.12 Before pushing the rear panel

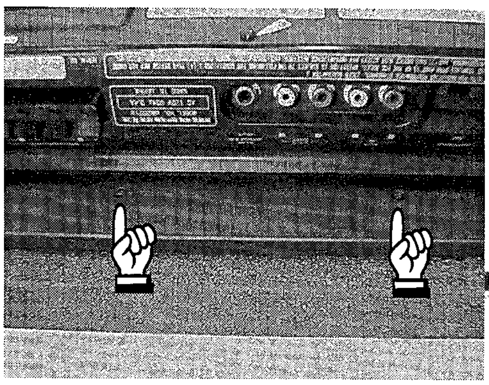


Fig.13 Pushed the rear panel

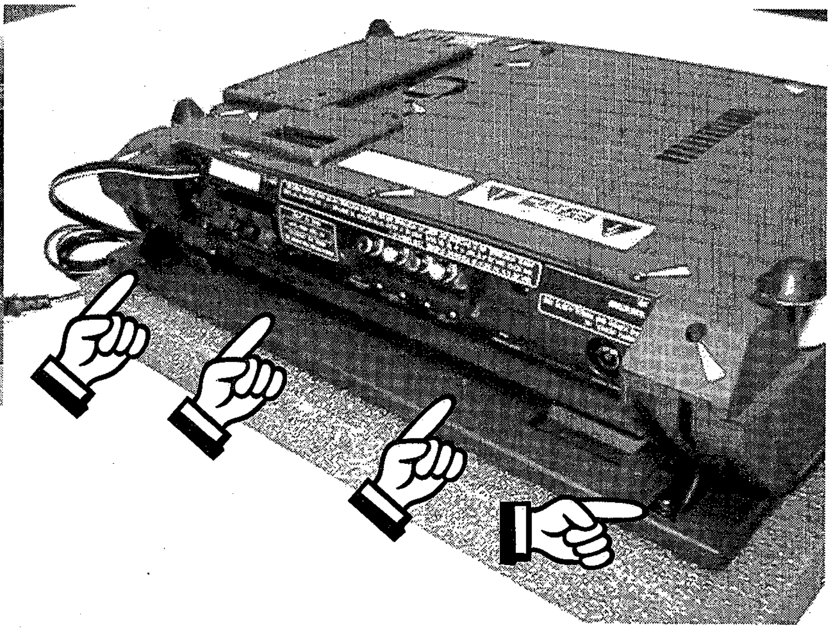


Fig.14 Positions of 4 screws

(3) Turn the MR2021 to normal operating position.
(4) Open the top panel of MR2021 by hand.
(5) Remove 2 screws (M2 type screw) on the top (see fig.15).

(3) 裏返っていたセットを、元に戻します。
(4) トップパネルを持ち上げ開きます。
(5) トップパネルの手前裏側のM2皿ネジ２本をはずします (図15)。

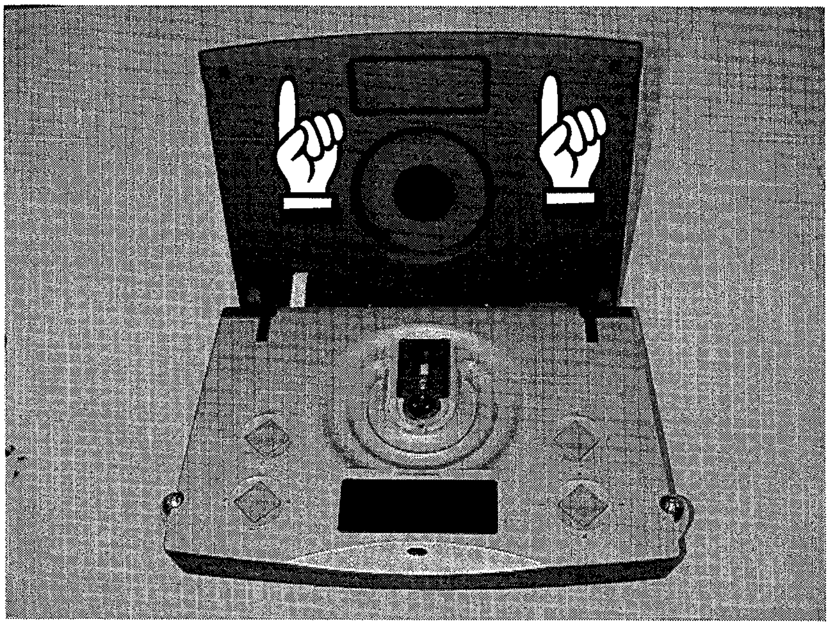


Fig.15 Positions of 2 screws on the top

(6) The upper part and lower part of the top panel are connected to each other with adhesive tapes. Separate these parts by pushing the transparent upper part in the middle (on CD shaped part) from the lower part, while holding the lower part.
(7) The upper part and lower part of the top panel were separated (See fig.16 and fig.17).

(6) これでトップパネル（アクリルウインドウ）が外れる状態です。ただし、固定補助のための両面テープが付いていますので、トップパネル裏側中央の丸穴より、アクリルウインドウを押し上げるようにして、取り外してください。
(7) トップパネル（アクリルウインドウ）が外れた状態が下の図です(図 16, 図 17)。

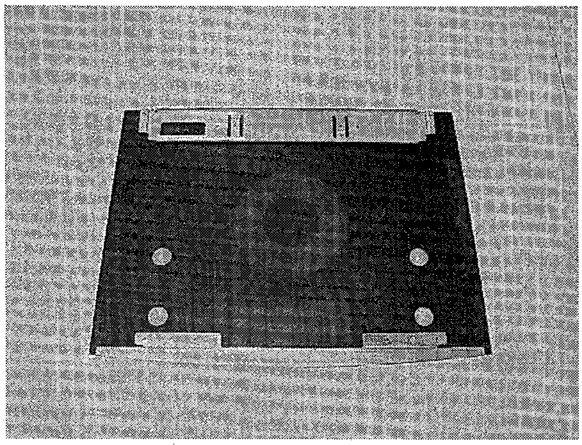


Fig.16 The upper part of the top panel (the reverse side)

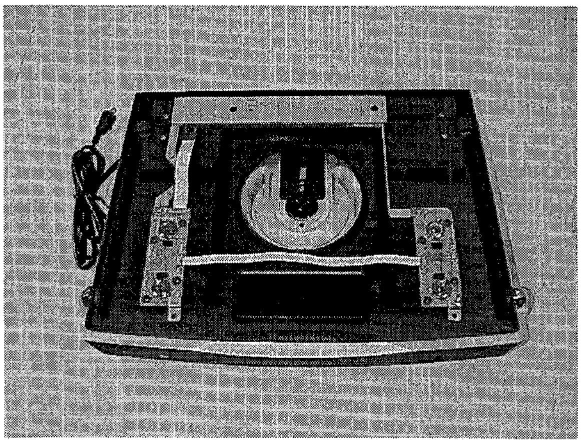


Fig.17 The lower part of the top panel and the others

## 2-2. REPAIR INTRODUCTION

### PREPARATION FOR CD BLOCK

1. Set a disc for repair into product.
2. Turn the product upside down on the jig (Parts No.*MR2021JIG). Take care that the top panel will not damaged, especially 4 levers. (Refer to "How to disassemble ")
3. For the top panel will not open while repairing, remove the connecting wires of panel motor from the connector (J812).
4. Repair and operate it on the upside down position of the product.

### PREPARATION FOR MAIN AMPLIFIER PCB (P704)

1. Main amplifier is BTL output.
2. For removing the main amplifier PCB (P704) from the product, remove the wire (W802) from the terminal (WU02) of microprocessor PCB (PU04). Connect another wire with the terminal (WU02) and GND as chassis instead of the wire (W802).

REMARK

Remove the bottom case from the product, Do not output signals of over 1W from both channels more than 10 minutes continuously.

## 2-3. EXPLANATION OF CIRCUITS

### FAN OPERATION

The voltage added to the diode (D852) is depended on the resistance of the thermistor (R857) and resistors (R855,R858). When the temperature of the heat sink goes up, the resistance of the thermistor (R857) decreases, and the voltage added to the diode (D852) increases.

1. When the temperature of the heat sink is over 70 degrees Celsius, then D852 is on, through R852, Q851 is on, and the fan starts to revolve.
2. When the temperature of the heat sink is approx. 100 degrees Celsius or more, through R853, Q853 is on, and the product is STAND-BY status. But, if the fan revolve normally, the temperature of the heat sink will not be over 100 degrees Celsius and not be STAND-BY status. Therefore, the procedure of the over heat protection circuit check is as follows;

(1) Connect the test point (J814) with a resistor of 680 ohm.
(2) If the product is STAND-BY status, this circuit is normal.
(3) Remove the resistor of 680 ohm from the test point (J814).

### FAN OPERATION CHECK

Keep outputting 2.5W from both channels of the product.

## 2-2. 修理における注意点

### CDブロックの修理は次のように行って下さい。

1. 修理作業に必要なDISCを本体にセットします。
2. 本体の上面（トップパネル）を下にして設置します。（要専用治具 Part No.*MR2021JIG、ボトムケースの外し方を参照。）
3. 修理中にトップパネルが不用意に開かないように、パネルモーターのリード線をJ812から外して下さい。
4. 上下逆の状態で、DISCを再生して修理作業を行って下さい。

### メインアンプ基板(P704)の修理について

1. パワーアンプはBTL出力になっています。
2. メインアンプ基板(P704)をセットから分離するために、W802のリード線をマイコン基板(PU04)の端子WU02から外し、W802の代替として端子WU02とシャーシなどに別途リード線を接続して下さい。

注意

底蓋（ボトムケース）を分離した状態ではFANの効果がありません。両チャンネル1Wを超える出力を連続して（10分以上）出力しないで下さい。

## 2-3. 回路説明

### FAN OPERATION

D852に印加される電圧はサーミスタ(R857)とR855とR858のそれぞれの抵抗値で決まります。ヒートシンクの温度が上昇すると、サーミスタ(R857)の抵抗値が下がり、D852に印加される電圧は上がります。

1. ヒートシンクの温度が約70℃を超えると、D852がONし、R852を通って、Q851が導通を開始し、FANが回転を始めます。また、ヒートシンクの温度が約70℃以上において、D852のアノード電圧は、ヒートシンクに比例して上昇し、それにつれてFANの回転数も上昇します。
2. ヒートシンクの温度が約100℃（オーバーヒート）になると、R853を通って、Q853がONし、本体はスタンバイになります。ただし、FANが正常に動作していれば、フルパワーでもヒートシンクの温度が100℃を超えることは無く、スタンバイにはなりません。

従って、オーバーヒート・プロテクション回路動作チェックは次のように行います。

(1) テストポイント（J814）に680Ωの抵抗を接続します。
(2) 本体がスタンバイになれば、回路は正常に動作しています。
(3) テストポイント（J814）から抵抗を外します。

### FAN OPERATION CHECK

底蓋（ボトムケース）を分離してない状態では、両チャンネルに2.5Wの出力を加えて10分以内にFANが回転すれば、回路は正常に動作しています。

When the bottom case is closing. If the fan revolving starts within 10 minutes, the function is correct working.
Otherwise keep outputting 1W from both channels of the product when the bottom case is opening. If the fan revolving starts within 5 minutes, the function is correct working.

REMARK

Do not output over 1W when the bottom case is open.

### VCC CONTROL

The regulation of primary voltage is not so higher intentionally for decreasing the no-load loss. Therefore, this circuit is used for the product to keep the voltage tolerance of the power IC. This circuit do not work when the output is from 0 to approx. 1Vrms. Then VCC is supplied from D709 only. When the output is more than 1Vrms, through D701-D704, R722, D706, and Q703 is on, current is supplied from Q702. When the output is over approx. 3Vrms, D709 is off, and VCC is supplied from Q702 only.

### SPEAKER PROTECTION

1. When either terminal of BTL outputs connect with GND (chassis) by mistake, the speaker protection circuit will work as follows. through R707-R710, Q704 or Q705 is on, and Q706 is on. Then #5Pin for Q701 is 0V, power IC (Q701) will be in power off. Therefore, the product will be STAND-BY status.
2. When the VCC CONTROL circuit is working correctly, maximum current of R825 is 1A, and voltage between R825 load is maximum 0.33V. When both terminals of BTL outputs are shorted on outputting over 0.25W, R825 is supplied over 2A, Q807 and Q803 is on, and the product will be STAND-BY status.

### CD 5V ON/OFF CONTROL

The voltage for CD (CD 5V) is supplied from QX04 when the following conditions are satisfied fully. (for noise and laser protection)

1. Setting a disc on the product, and QU08 is on.
2. Closing top panel, and #78Pin for QU10 is 0V.
3. The product is in CD mode.

### MUTE CONTROL

Mute signals output from microprocessor (QU10) are "MUTE (Pin No.37)", "MUTE2 (Pin No.7)", and "DSC MUTE (Pin No.5)".
Fig.1 is workable output terminals by each mute signals, Fig.2 is the status of each mute.

また、底蓋（ボトムケース）を分離した状態では、両チャンネルに1Wの出力を加えて5分以内にFANが回転すれば、回路は正常に動作しています。

注意

この状態ではパワーICの放熱が十分ではないので、1Wを超える出力を加えないで下さい。

### VCC CONTROL

MR2020のトランスは無負荷損失を極力少なくする為に、1次側のレギュレーションを故意に下げています。このためにパワーICの定格電圧をオーバーしないようにこの回路が使われています。
無信号から出力1Vrms位まではこの回路は動作せず、VCCはD709からのみ供給されます。約1Vrmsを超えると、D701-D704, R722, D706を通って、Q703が導通を開始しQ702からも電流が供給されます。
約3Vrmsを超えるとD709はOFFとなり、VCCはQ702からのみ供給されます。

### SPEAKER PROTECTION

1. BTL出力の片側が誤ってGNDに接続された場合は、次のようにスピーカープロテクション回路が働きます。R707-R710を通ってQ704又はQ705がONとなり、Q706がONします。次にQ701の#5PINが0Vになり、パワーIC（Q701）内部の電源をOFFにします。よって、本体はスタンバイになります。
2. VCC CONTROL回路が正常に動作していれば、通常R825に流れる電流は最大1Aで、R825の両端電圧は最大、0.33Vです。0.25W以上の出力中にBTL出力の両端をショートすると、R825に2A以上の電流が流れQ807, Q803が直ちにONとなりスタンバイになります。

### CD 5V ON/OFF CONTROL

CD 5VはTUNERへのノイズ妨害と、LASER出力の外部への漏れを防止する為に次の条件が揃った時にQX04を通して供給されます。

1. DISCがセットされ、QU08がON。
2. PANELがCLOSEし、QU10の#78PINが0V。
3. FUNCTIONがCD。

### MUTE CONTROL

マイコン（QU10）から出力するMUTE信号は、MUTE（Pin No. 37），MUTE2（Pin No. 7），DSC MUTE（Pin No.5）の3つで、Fig.1が各MUTE信号によりMUTEが働く出力、Fig.2が各MUTEの働く条件を示します。

Fig.1

| | Q701(SPK) | QN01-QN04 (PHONE) | QX05,QX06 (SUB WOOFER) | QX07,QX08 (LINE OUT) | QE01 |
|---|---|---|---|---|---|
| MUTE | YES | YES | YES | NO | NO |
| MUTE2 | NO | NO | NO | YES | NO |
| DSC MUTE | NO | NO | NO | NO | YES |

Fig.2

| | POWER ON/OFF | CD MODE STOP OR TRACK JUMP | MUTE BUTTON ON | MODE CHANGE | VOLUME MINIMUM |
|---|---|---|---|---|---|
| MUTE | YES | YES | YES | YES | YES |
| MUTE2 | YES | YES | NO | YES | NO |
| DSC MUTE | NO | YES | NO | NO | NO |

### TOP PANEL OPEN SENSOR

1. The pulse (T=84msec, Duty 50%) is always added to LED (QU15), from #30Pin of QU10, through RF28 and QU22.
2. Cover the sensor with your fingers, the collector voltage of QU01 goes up over 0.7VP-P. and through RU71 and QU09, the pulse of 5VP-P inputs to #29Pin of QU10. Then the top panel will open.
3. Not needing to cover the sensor with your fingers, QU01 receives the light of LED reflected by lens oneself. Therefore, the collector of QU01 adds the reverse pulse through RF29, QU26 and RF32, for reduced incorrect working. So, the voltage of residual pulse for the collector of QU01 is suppressed to 0.1VP-P.

REMARK

When the sensor receives sunlight or a strong light as incandescent, top panel might open.

### POPS NOISE KILLER

RX72, CX70 and QX70 are the circuit to delay power supply for approx. 2 seconds. Therefore, this circuit prevents pops noise generation when power switch is on or off.

### SUB WOOFER

Sub woofer output is composed a low pass filter of cut-off frequency 150Hz octave 12dB. It is output 2V for AUX L,R input 60Hz, 200mV (volume is maximum).

REMARK

Sub woofer output level is depended on volume control.

### TOP PANEL OPEN SENSOR

1. QU10の#30PINからRF28, QU22を通ってQU15のLEDに、パルス(T=84msec、Duty,50%)が常に印加されています。
2. 指をSENSORのレンズに当てると、QU01のコレクタ電圧が 0.7VP-P 以上となり、RU71, QU09 を通って、QU10の#29PINに5VP-Pのパルスが入力され、トップパネルはオープンします。
3. 指を SENSOR のレンズに当てなくても、LED の光はレンズ自身に反射してQU01に当たってしまいます。そのため、RF29, QU26, RF32を通してQU01のコレクタに逆極性のパルスを印加する事で、誤動作を軽減させています。この結果、通常QU01のコレクタの残留パルス電圧は0.1VP-P程度に抑えられています。

注意

直射日光や白熱電球などの強い光を受けるとトップパネルが開く場合があります。

### POPS NOISE KILLER

RX72, CX70, QX70はQH01への電源の供給に約2秒の時定数を持たせ、POWER ON/OFFにおけるポップスノイズの発生を防止する回路です。

### SUB WOOFER

SUB WOOFER出力はカットオフ周波数 150Hz オクターブ 12 dB の low pass filter の構成です。AUX L, R 入力 60Hz , 200mV ボリューム最大で 2V の出力が得られます。

注意

SUB WOOFER OUTPUT LEVEL は VOLUME CONTROLにより可変します。

# 3 SERVICE MODE

### 1. How to set the service mode

(1) While holding the CLOCK and CLEAR buttons together, put the mains plug to mains outlet.

(2) FL check mode will start.

(3) While in FL check mode, each time the FUNCTION button pressed (within 2 seconds), the mode changes in the following order.
TR FREQ (Tracking point frequency memory mode) ➛ CD TEST (CD test mode) ➛ FL CHK (FL check mode) ➛ TR FREQ (Tracking point frequency memory mode)

### 2. FL CHECK MODE

FL check mode will continue until changing other mode.

### 3. TRACKING POINT FREQUENCY MEMORY MODE

This mode is not available for repair (This is for check in factory.). If you set in this mode, some frequencies will register in each preset memory.

REMARK

User programmed frequencies will be deleted.
While in Tracking point frequency memory mode, press the MEMO button. Press the CLEAR and the DISPLAY buttons together. The display shows "CLEAR" 2 seconds. Then all memories will be clear.

### 4. CD TEST MODE

(1) Press the "+" button, then the sledge move to the outside. Press the "-" button then the sledge move to the inside. Press the CLEAR button while the sledge is moving, then the sledge stop.

(2) Press the MEMO button, then the laser pick up unit is giving out the beam. Press the MEMO button again then the laser pick up unit stop beam out. All operations are available without the Disc.

(3) While in CD test mode, CD play is available in opening the top panel.

(4) If any ERROR is happened, the display shows "CD ERRX". (X is a ERROR code.) The ERROR message will not be clear until pressing STOP or POWER buttons.

| Error Code | Description |
|---|---|
| 1 | The sledge switch not turn on. |
| 2 | The sledge switch not turn off. |
| 3 | The laser pick up unit not focus. |
| 4 | The tracking is not fixed. |
| 5 | The spindle motor not locked. |

### 5. How to stop the service mode

Press the POWER button. Then product will be in POWER OFF (STAND-BY).

REMARK

The microprocessor will not be clear by this operation.
(Refer to "3. TRACKING POINT FREQUENCY MEMORY MODE")

# 3 SERVICE MODE

### 1. SERVICE MODE の設定方法

(1) クロックボタン（左上のレバー下方向）とCLEARボタン（左下のレバー上方向）を押しながら（倒しながら）電源コードを接続します。

(2) FLチェックが始まります。(FL CHECKモード)

(3) FLチェック時、FUNCTIONボタン（右上のレバー左方向）を（2秒以内に）押す（倒す）ごとに、トラッキングポイント周波数メモリーモード(TR FREQ) → CD TESTモード → FL CHECKモードへと切り換わります。

### 2. FL CHECKモード

他のモードに切り換えない限り、FLチェックを繰り返します。

### 3. トラッキングポイント周波数メモリーモード

このモードは、工場チェック用のため使用しません。
このモードを設定すると、いくつかの周波数がそれぞれのプリセット番地にメモリーされます。

注意

ユーザーのプリセットデータがある場合にはオーバーライトされます。
このモード時に、MEMOボタンを押してから、CLEARボタンとDISPLAYボタンを同時に押すとメモリーがクリアされます。

### 4. CD TESTモード

(1) CD STOP時、＋ボタンでスレッジが外周に、－ボタンで内周に移動し、CLEARボタンで停止します。

(2) CD STOP時、MEMOボタンでCDレーザーのON/OFFします。

(3) CD TESTモードの時は、トップパネルが開いた状態でもCD PLAY可能です。

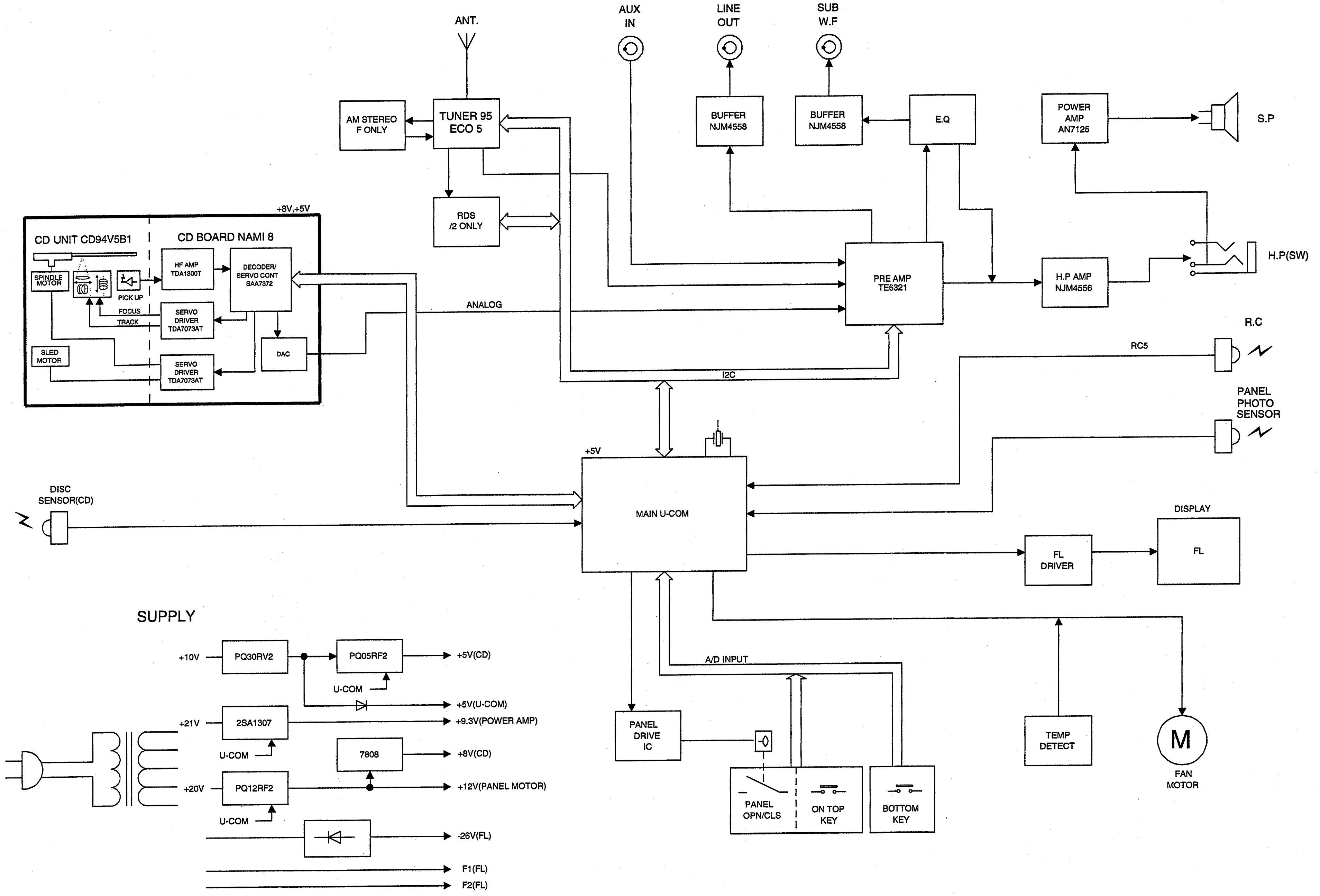
(4) CD TESTモードの時は、CDを動作させた場合に、何らかのERRORがあれば、DISPLAYに「CD ERRX」("X"は下表のエラーコード）と表示します。表示は、STOPまたはPOWERのいずれかのボタンが押されるまで継続されます。

| エラーコード | エラーの詳細 |
|---|---|
| 1 | スレッジのスイッチがONしない |
| 2 | スレッジのスイッチがOFFしない |
| 3 | フォーカスが合わない |
| 4 | トラッキングが合わない |
| 5 | スピンドルモーターがロックしない |

### 5. SERVICE MODE の解除方法

POWERボタンを押します。スタンバイになり、以後通常動作になります。
※ メモリーのクリアーはされません。クリアーの方法は「3．トラッキングポイント周波数メモリーモード」を参照して下さい。

## 4-1 BLOCK DIAGRAM


ANT.
AUX IN
LINE OUT
SUB W.F
AM STEREO F ONLY
TUNER 95 ECO 5
RDS /2 ONLY
BUFFER NJM4558
BUFFER NJM4558
E.Q
POWER AMP AN7125
S.P
H.P(SW)
+8V,+5V
CD UNIT CD94V5B1
CD BOARD NAMI 8
SPINDLE MOTOR
PICK UP
FOCUS
TRACK
HF AMP TDA1300T
DECODER/ SERVO CONT SAA7372
SERVO DRIVER TDA7073AT
SERVO DRIVER TDA7073AT
SLED MOTOR
DAC
ANALOG
PRE AMP TE6321
H.P AMP NJM4556
R.C
RC5
I2C
PANEL PHOTO SENSOR
+5V
DISC SENSOR(CD)
MAIN U-COM
DISPLAY
FL DRIVER
FL
A/D INPUT
PANEL DRIVE IC
PANEL OPN/CLS
ON TOP KEY
BOTTOM KEY
TEMP DETECT
M
FAN MOTOR
SUPPLY
+10V
PQ30RV2
PQ05RF2
+5V(CD)
U-COM
+5V(U-COM)
+21V
2SA1307
+9.3V(POWER AMP)
U-COM
7808
+8V(CD)
+20V
PQ12RF2
+12V(PANEL MOTOR)
U-COM
-26V(FL)
F1(FL)
F2(FL)

## 4-2 AMステレオ調整手順

調整箇所　：LA01 (PA04 基板)
調整周波数：999kHz　INPUT＝50mV/m
変調条件　：400Hz (L+R)=80% MOD. 25Hz PILOT OFF

1. SGの変調を(L-R)，PILOT OFFにします。
2. セットのLch(又はRch)の出力が最小になるように、LA01を微調整します。

注意：

・他の、コイル又は調整箇所は調整済みですので回さない事。
・調整は、蛍光灯や電源ノイズの無い場所で行ない、必ずテストループアンテナを使うこと。

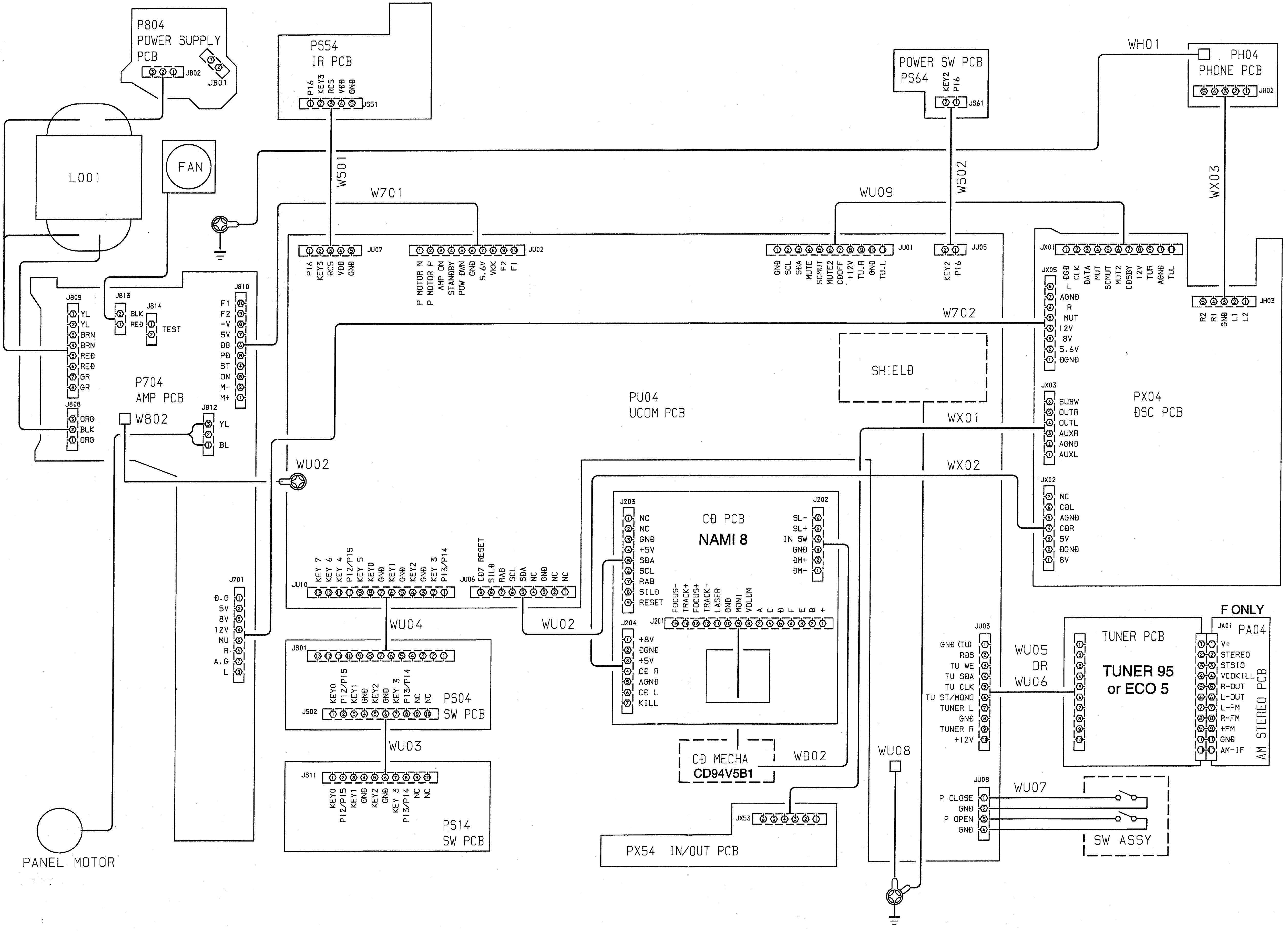
## 4-3 MICROPROCESSOR DATA

QU01

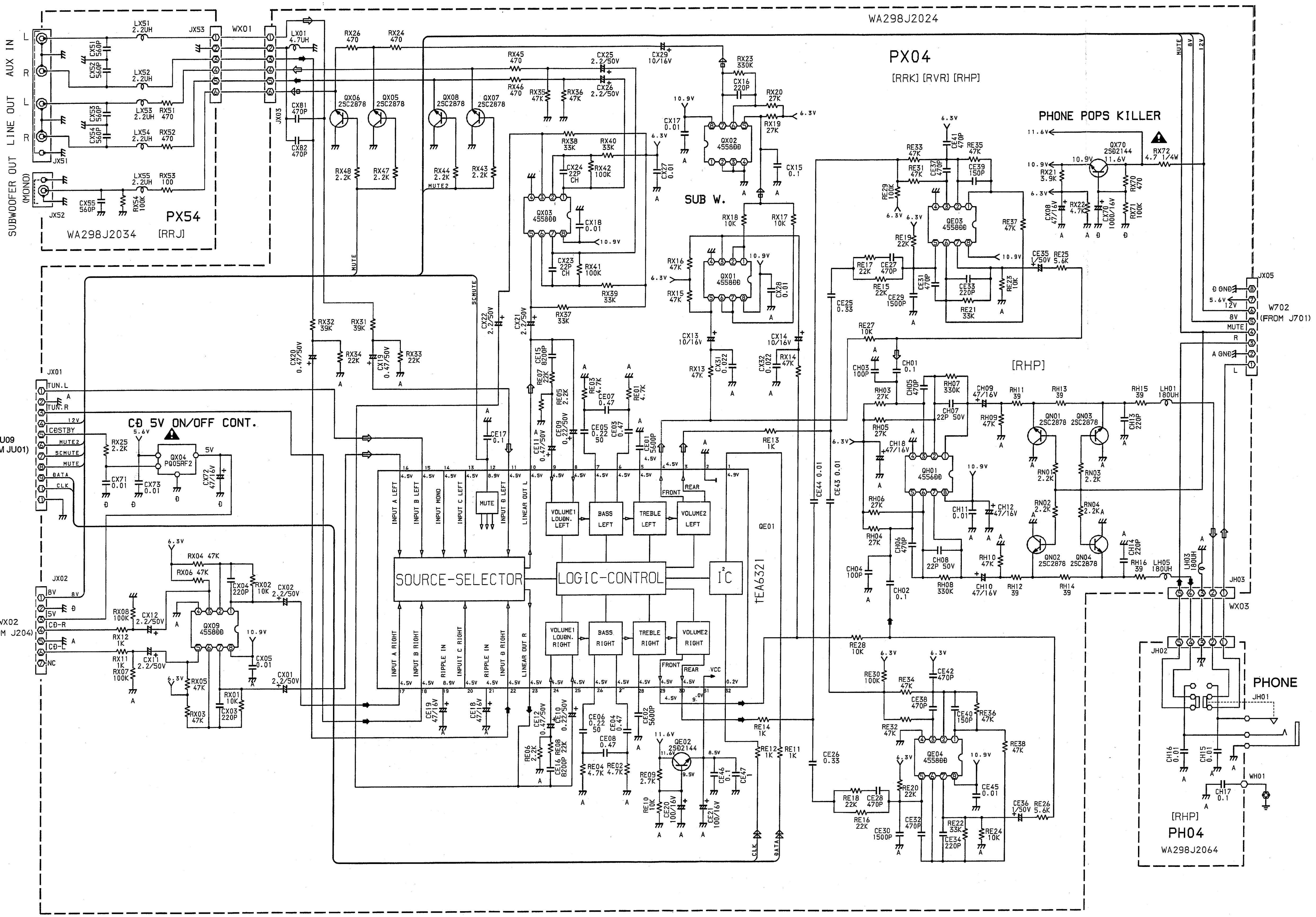
| Pin No. | Pin Name | Signal Name | I/O | Active | Slow | Function |
|---|---|---|---|---|---|---|
| 1 | P10 (INT0) | _POW_DWN | INT | ↓ | L | POWER DOWN |
| 2 | P11 (INT1) | _STANDBY | OUT | L | L | POWER STANDBY |
| 3 | P12 (INT2) | SDA | IN/OUT |  | - | IIC SDA(for RDS,DSC) |
| 4 | P13 (DVO) | SCL | OUT | H | L | IIC SCL(for RDS,DSC) |
| 5 | P14 | DSC_MUTE | OUT | L | L | DSC MUTE |
| 6 | P15 | _CD_STANDBY | OUT | L | L | CD STANDBY |
| 7 | P16 | _MUTE2 | OUT | L | L | LINE MUTE |
| 8 | P17 | * | IN | - | - | N.C |
| 9 | TEST | - | IN | - | - | GND |
| 10 | P21 (XTIN) | 32.768kHz | IN | - | - | SUB X-TAL |
| 11 | P22 (XTOUT) | 32.768kHz | OUT | - | - | SUB X-TAL |
| 12 | RESET | _RESET | IN | L | - | RESET |
| 13 | XIN | 8.0MHz | IN | - | - | X-TAL |
| 14 | XOUT | 8.0MHz | OUT | - | - | X-TAL |
| 15 | VSS | - | GND | - | - | GND |
| 16 | P20 (INT5) | _HOLD | IN | L | - | HOLD IN |
| 17 | P30 (INT3) | _RCIN | INT | ↑ | - | RC-5 BUS IN |
| 18 | P31 | _RCOUT | OUT | L | L | RC-5 BUS OUT |
| 19 | P32 (SCK) | TUNE_CLK | OUT | H | L | TUNER CLK |
| 20 | P33 (SI) | _TUNE_WE | OUT | L | - | TUNER WRITE ENABLE |
| 21 | P34 (SO) | TUNE_SDA | IN/OUT | H | L | TUNER SDA |
| 22 | P35 (HSCK) | TUNER_ST_M ON | IN | H | L | TUNER STEREO/MONO |
| 23 | P36 | CD7_RESET | OUT | L | L | CD7 RESET |
| 24 | P37 (HSO) | DISC_IN | IN | H | - | DISC IN SENSOR |
| 25 | P00 | SILD | OUT | L | L | CD7 CONTROL |
| 26 | P01 | RAB | OUT | H | L | CD7 CONTROL |
| 27 | P02 | SCL | OUT | H | L | CD7 CONTROL |
| 28 | P03 | SDA | IN/OUT | H | L | CD7 CONTROL |
| 29 | P04 | P_SEN_IN | IN | H | - | PANEL SENSOR IN |
| 30 | P05 | P_SEN_OUT | OUT | H | L | PANEL SENSOR OUT |
| 31 | P06 | P_MOTOR_P | OUT | H | L | PANEL MOTOR + |
| 32 | P07 | P_MOTOR_N | OUT | H | L | PANRL MOTOR - |
| 33 | VDD | +5V | +5VS | - | - | VDD |
| 34 | P60 (G15) | * | IN | - | - | N.C |
| 35 | P61 (G14) | * | IN | - | - | N.C |
| 36 | P62 (G13) | AMPON | OUT | H | L | AMP POWER ON |
| 37 | P63 (G12) | MUTE | OUT | H | L | MUTE |
| 38 | P64 (G11) | _RDS_ON | OUT | H | L | RDS_POWER |
| 39 | P65 (G10) | 11G | OUT | H | - | DIGIT OUT |
| 40 | P66 (G9) | 10G | OUT | H | - | DIGIT OUT |

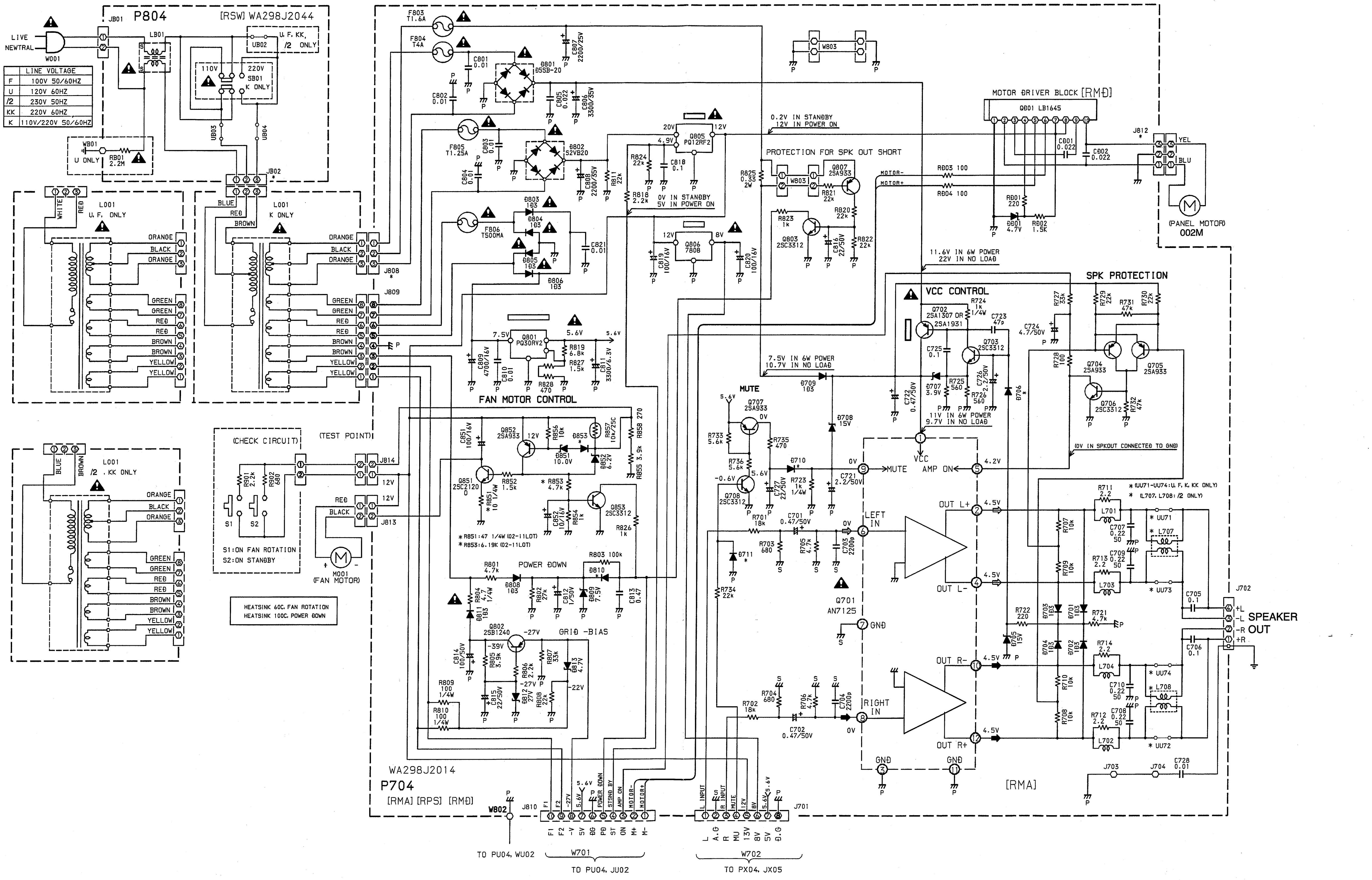
| Pin No. | Pin Name | Signal Name | I/O | Active | Slow | Function |
|---|---|---|---|---|---|---|
| 41 | P67 (G8) | 9G | OUT | H | - | DIGIT OUT |
| 42 | P70 (G7) | 8G | OUT | H | - | DIGIT OUT |
| 43 | P71 (G6) | 7G | OUT | H | - | DIGIT OUT |
| 44 | P72 (G5) | 6G | OUT | H | - | DIGIT OUT |
| 45 | P73 (G4) | 5G | OUT | H | - | DIGIT OUT |
| 46 | P74 (G3) | 4G | OUT | H | - | DIGIT OUT |
| 47 | P75 (G2) | 3G | OUT | H | - | DIGIT OUT |
| 48 | P76 (G1) | 2G | OUT | H | - | DIGIT OUT |
| 49 | P77 (G0) | 1G | OUT | H | - | DIGIT OUT |
| 50 | P80 (S0) | P16 | OUT | H | - | SEGMENT OUT |
| 51 | P81 (S1) | P15 | OUT | H | - | SEGMENT OUT |
| 52 | P82 (S2) | P14 | OUT | H | - | SEGMENT OUT |
| 53 | P83 (S3) | P13 | OUT | H | - | SEGMENT OUT |
| 54 | P84 (S4) | P12 | OUT | H | - | SEGMENT OUT |
| 55 | P85 (S5) | P11 | OUT | H | - | SEGMENT OUT |
| 56 | P86 (S6) | P10 | OUT | H | - | SEGMENT OUT |
| 57 | P87 (S7) | P9 | OUT | H | - | SEGMENT OUT |
| 58 | P90 (S8) | P8 | OUT | H | - | SEGMENT OUT |
| 59 | P91 (S9) | P7 | OUT | H | - | SEGMENT OUT |
| 60 | P92 (S10) | P6 | OUT | H | - | SEGMENT OUT |
| 61 | P93 (S11) | P5 | OUT | H | - | SEGMENT OUT |
| 62 | P94 (S12) | P4 | OUT | H | - | SEGMENT OUT |
| 63 | P95 (S13) | P3 | OUT | H | - | SEGMENT OUT |
| 64 | P96 (S14) | P2 | OUT | H | - | SEGMENT OUT |
| 65 | P97 (S15) | P1 | OUT | H | - | SEGMENT OUT |
| 66 | VKK | -B | - | - | - | Power Supply for FL |
| 67 | P40 (KEY0) | Key0 | IN | H | - | Key0 |
| 68 | P41 (KEY1) | Key1 | IN | H | - | Key1 |
| 69 | P42 (KEY2) | Key2 | IN | H | - | Key2 |
| 70 | P43 (KEY3) | Key3 | IN | H | - | Key3 |
| 71 | P44 (KEY4) | Key4 | IN | H | - | Key4 |
| 72 | P45 (KEY5) | Key5 | IN | H | - | Key5 |
| 73 | P46 (KEY6) | Key6 | IN | H | - | Key6 |
| 74 | P47 (KEY7) | Key7 | IN | H | - | Key7 |
| 75 | P50 (A/D) | _DAVN | IN | L | - | RDS DAVAN |
| 76 | P51 (A/D) | _PSWN | IN | L | - | RDS PSWN |
| 77 | P52 (A/D) | _P_OPEN | IN | L | - | PANEL SW OPEN |
| 78 | P53 (A/D) | _P_CLOSE | IN | L | - | PANEL SW CLOSE |
| 79 | P54 | VER_SET0 | IN | - | - | $\frac{0}{0}$:F $\frac{1}{0}$:U $\frac{0}{1}$:K,KK $\frac{1}{1}$: /2- |
| 80 | P55 | VER_SET1 | IN | - | - |  |

# 5. WIRING DIAGRAM

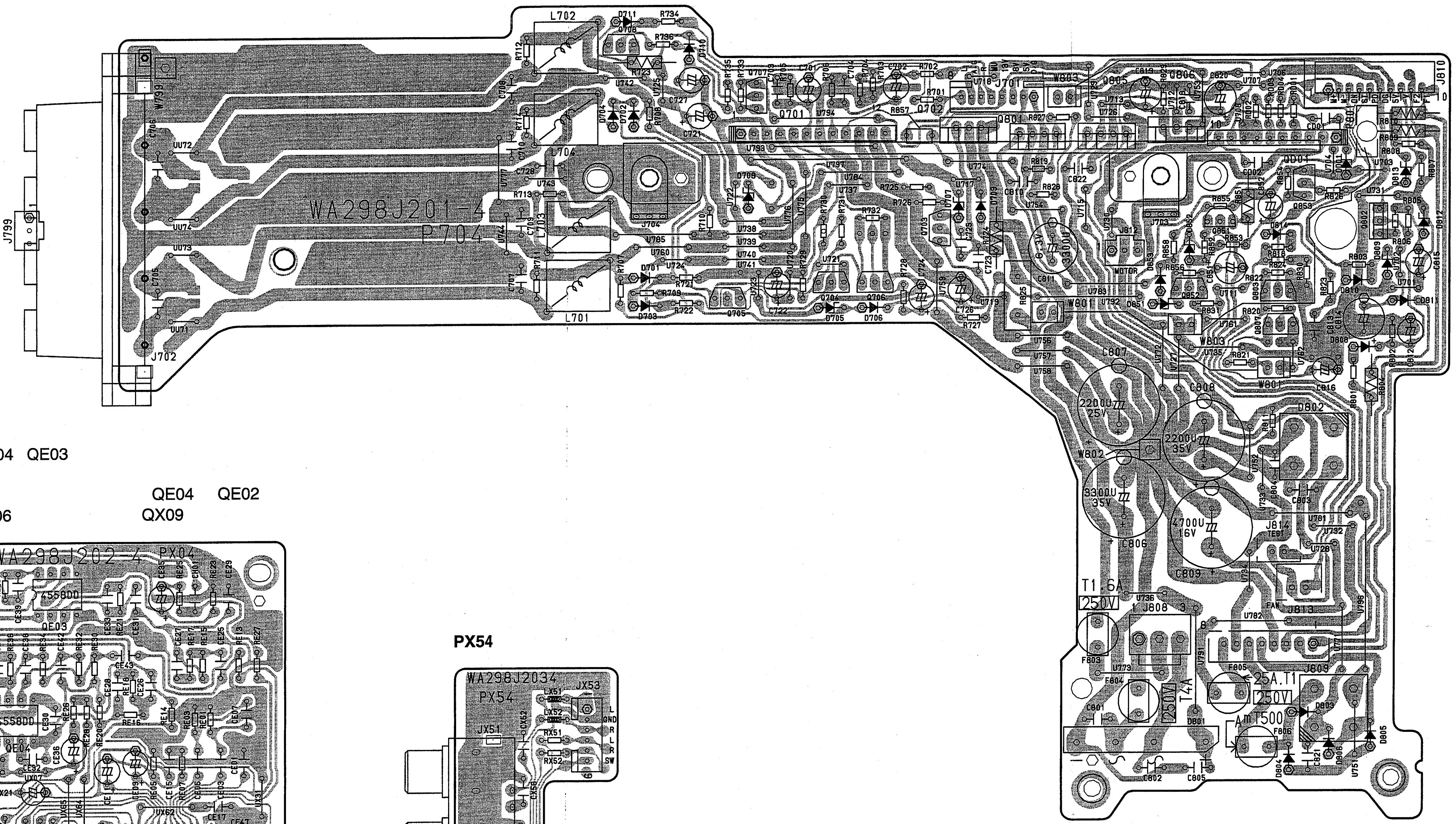

P804
POWER SUPPLY
PCB
JB02
JB01
L001
FAN
PS54
IR PCB
P16 KEY3 RC5 VDD GND
JS51
POWER SW PCB
PS64
KEY2 P16
JS61
WH01
PH04
PHONE PCB
JH02
WS01
W701
WU09
WS02
WX03
JU07
P16 KEY3 RC5 VDD GND
JU02
P MOTOR N
P MOTOR P
AMP ON
STANDBY
POW DWN
GND
5.6V
VKK
F2
F1
JU01
GND SCL SDA MUTE SCMUT MUTE2 CDOFF +12V TU.R GND TU.L
JU05
KEY2 P16
JX01
DGD CLK DATA MUT SCMUT MUT2 CDSBY 12V TUR AGND TUL
JH03
R2 R1 GND L1 L2
J809
YL YL BRN BRN RED RED GR GR
J808
ORG BLK ORG
J813
BLK RED
J814
TEST
J810
F1 F2 -V 5V DG PD ST ON M- M+
P704
AMP PCB
W802
J812
YL BL
W702
JX05
L AGND R MUT 12V 8V 5.6V DGND
SHIELD
JX03
SUBW OUTR OUTL AUXR AGND AUXL
PX04
DSC PCB
PU04
UCOM PCB
WX01
WX02
JX02
NC CDL AGND CDR 5V DGND 8V
WU02
J203
NC NC GND +5V SDA SCL RAB SILD RESET
CD PCB
NAMI 8
J202
SL- SL+ IN SW GND DM+ DM-
JU10
KEY 7 KEY 6 KEY 4 P12/P15 KEY 5 KEY0 GND KEY1 GND KEY2 GND KEY 3 P13/P14
JU06
CD7 RESET SILD RAB SCL SDA NC GND NC NC
J701
D.G 5V 8V 12V MU R A.G L
J204
+8V DGND +5V CD R AGND CD L KILL
J201
FOCUS- TRACK+ FOCUS+ TRACK- LASER GND MONI VOLUM A C D F E B +
WU04
WU02
JS01
KEY0 P12/P15 KEY1 GND KEY2 GND KEY 3 P13/P14 NC NC
PS04
SW PCB
JS02
WU03
JS11
KEY0 P12/P15 KEY1 GND KEY2 GND KEY 3 P13/P14 NC NC
PS14
SW PCB
CD MECHA
CD94V5B1
WD02
JX53
PX54 IN/OUT PCB
JU03
GND (TU) RDS TU WE TU SDA TU CLK TU ST/MONO TUNER L GND TUNER R +12V
WU05
OR
WU06
TUNER PCB
TUNER 95
or ECO 5
F ONLY
JA01
PA04
V+ STEREO STSIG VCOKILL R-OUT L-OUT L-FM R-FM +FM GND AM-IF
AM STEREO PCB
WU08
JU08
P CLOSE GND P OPEN GND
WU07
SW ASSY
PANEL MOTOR

# 6. SCHEMATIC DIAGRAM AND PARTS LOCATION

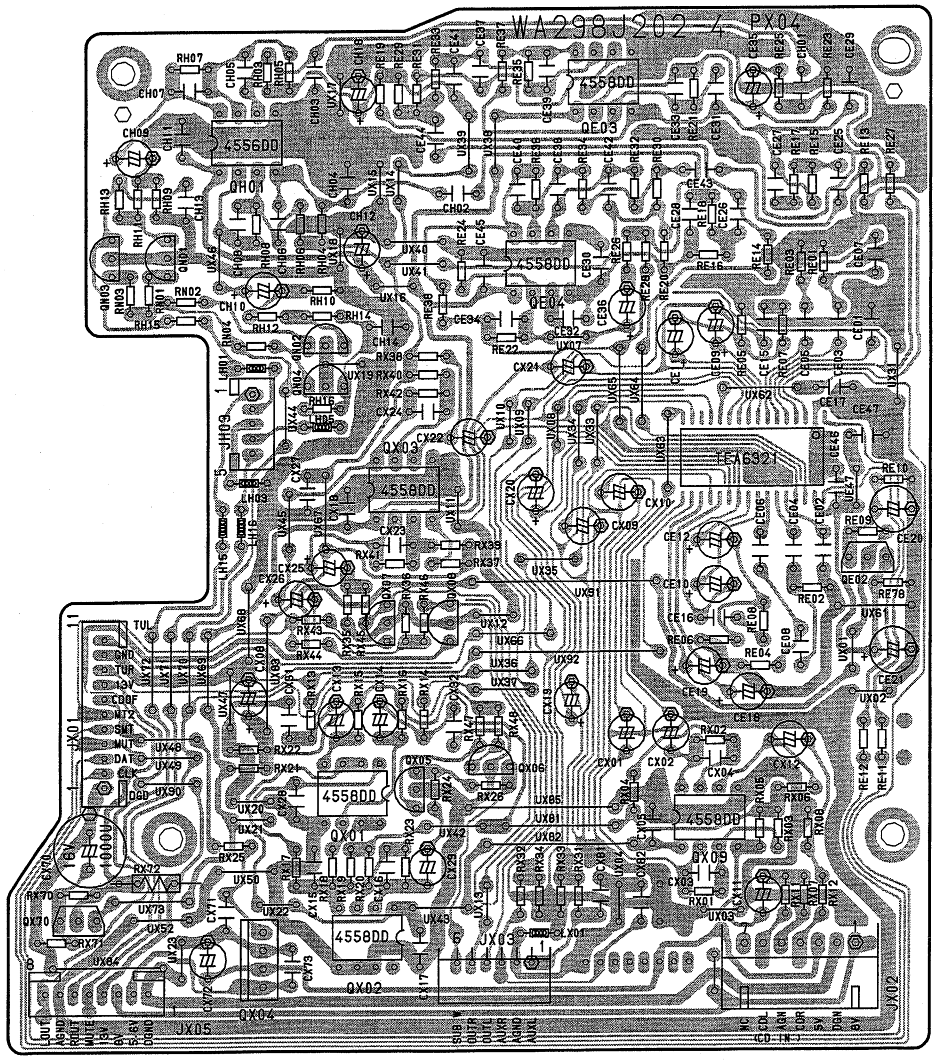

WA298J2024
PX04
[RRK] [RVR] [RHP]
PHONE POPS KILLER
SUB W.
AUX IN
LINE OUT
SUBWOOFER OUT (MONO)
PX54
WA298J2034 [RRJ]
WX01
JX53
JX51
JX52
JX01
WU09 (FROM JU01)
TUN.L
TUN.R
12V
CDSTBY
MUTE2
SCMUTE
MUTE
DATA
CLK
CD 5V ON/OFF CONT.
QX04 PQ05RF2
JX02
WX02 (FROM J204)
8V
5V
CD-R
CD-L
NC
QX09 4558DD
QX03 4558DD
QX02 4558DD
QX01 4558DD
QX06 2SC2878
QX05 2SC2878
QX08 2SC2878
QX07 2SC2878
QX70 2SD2144
QE03 4558DD
QE04 4558DD
QE02 2SD2144
QH01 4558DD
QN01 2SC2878
QN03 2SC2878
QN02 2SC2878
QN04 2SC2878
SOURCE-SELECTOR
LOGIC-CONTROL
I²C
TEA6321
QE01
INPUT A LEFT
INPUT B LEFT
INPUT MONO
INPUT C LEFT
MUTE
INPUT D LEFT
LINEAR OUT L
VOLUME1 LOUDN. LEFT
BASS LEFT
TREBLE LEFT
VOLUME2 LEFT
FRONT
REAR
INPUT A RIGHT
INPUT B RIGHT
RIPPLE IN
INPUT C RIGHT
RIPPLE IN
INPUT D RIGHT
LINEAR OUT R
VOLUME1 LOUDN. RIGHT
BASS RIGHT
TREBLE RIGHT
VOLUME2 RIGHT
VCC
[RHP]
JX05
W702 (FROM J701)
D GND
5.6V
12V
8V
MUTE
R
A GND
L
JH03
WX03
JH02
PHONE
JH01
WH01
[RHP]
PH04
WA298J2064
CLK
DATA


P804
[RSW] WA298J2044
LIVE
NEWTRAL
W001
LINE VOLTAGE
F 100V 50/60HZ
U 120V 60HZ
/2 230V 50HZ
KK 220V 60HZ
K 110V/220V 50/60HZ
U ONLY
RB01 2.2M
U.F.KK, /2 ONLY
K ONLY
SB01
L001
U.F. ONLY
K ONLY
/2 .KK ONLY
(CHECK CIRCUIT)
(TEST POINT)
S1:ON FAN ROTATION
S2:ON STANDBY
M001 (FAN MOTOR)
HEATSINK 60C: FAN ROTATION
HEATSINK 100C: POWER DOWN
FAN MOTOR CONTROL
POWER DOWN
GRID -BIAS
Q801 PQ30RV2
Q805 PQ12RF2
Q806 7808
0.2V IN STANDBY
12V IN POWER ON
0V IN STANDBY
5V IN POWER ON
PROTECTION FOR SPK OUT SHORT
MOTOR DRIVER BLOCK [RMD]
Q001 LB1645
(PANEL MOTOR)
002M
11.6V IN 6W POWER
22V IN NO LOAD
VCC CONTROL
SPK PROTECTION
7.5V IN 6W POWER
10.7V IN NO LOAD
11V IN 6W POWER
9.7V IN NO LOAD
MUTE
(0V IN SPKOUT CONNECTED TO GND)
AMP ON
LEFT IN
RIGHT IN
OUT L+
OUT L-
OUT R-
OUT R+
Q701 AN7125
GND
SPEAKER OUT
+L
-L
-R
+R
[RMA]
WA298J2014
P704
[RMA] [RPS] [RMD]
W802
J810
J701
F1 F2 -V 5V BG PD ST ON M+ M-
L A.G R MU 13V 8V 5V D.G
TO PU04, WU02
W701
TO PU04, JU02
W702
TO PX04, JX05

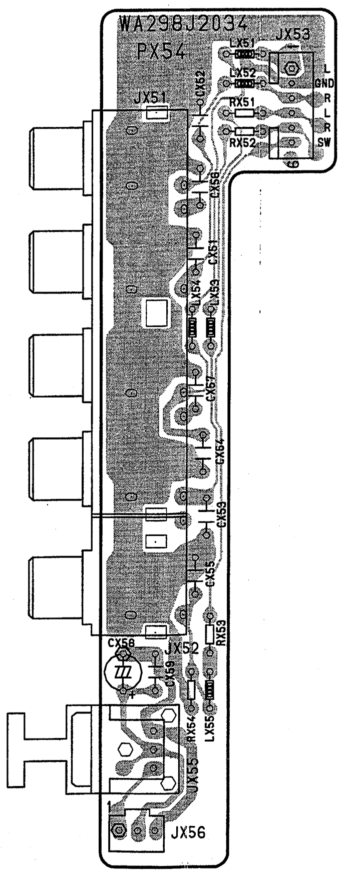
**P704**


Q708
Q707 Q701
Q705 Q704 Q706
Q702
Q703
Q801
Q805
Q806
Q852 Q851 Q803 Q807
QD01 Q853
WA298J201-4
P704
J799
J702
L701
L702
L703
L704
J810

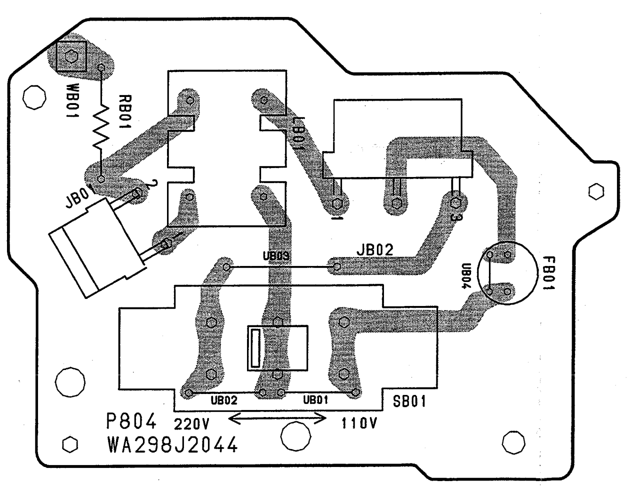
**PX04**


QN03 QN01 QH01
QN04 QN02
QX07 QX03 QX08
QX70
QX04 QX01 QX02 QX05 QX06
QE04 QE03
QE04 QE02
QX09
WA298J202-4 PX04
4558DD
TEA6321
JX05
JX01
JX02
JX03

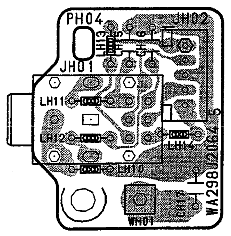
**PX54**

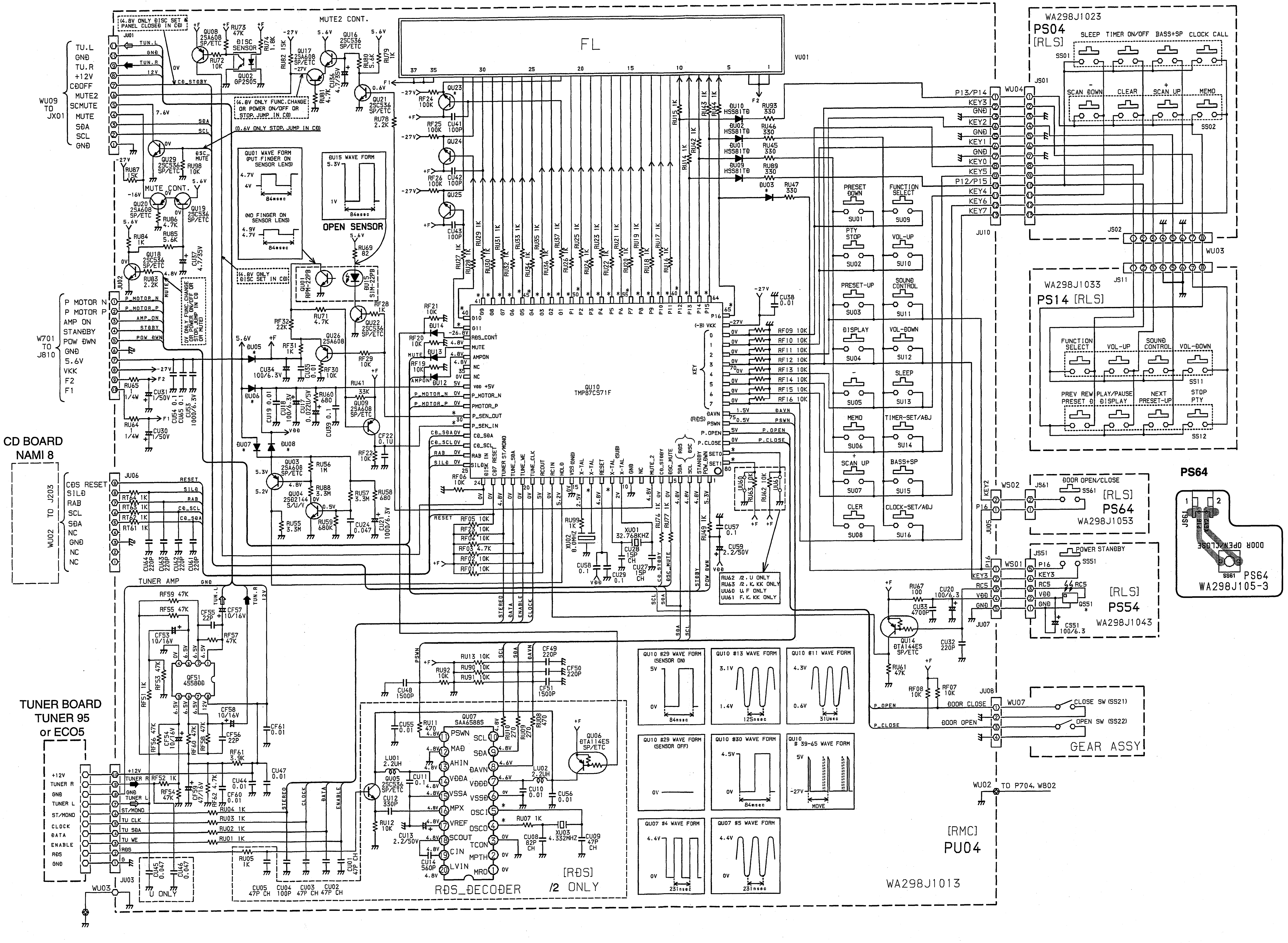

WA298J2034
PX54
JX51
JX52
JX53
JX56

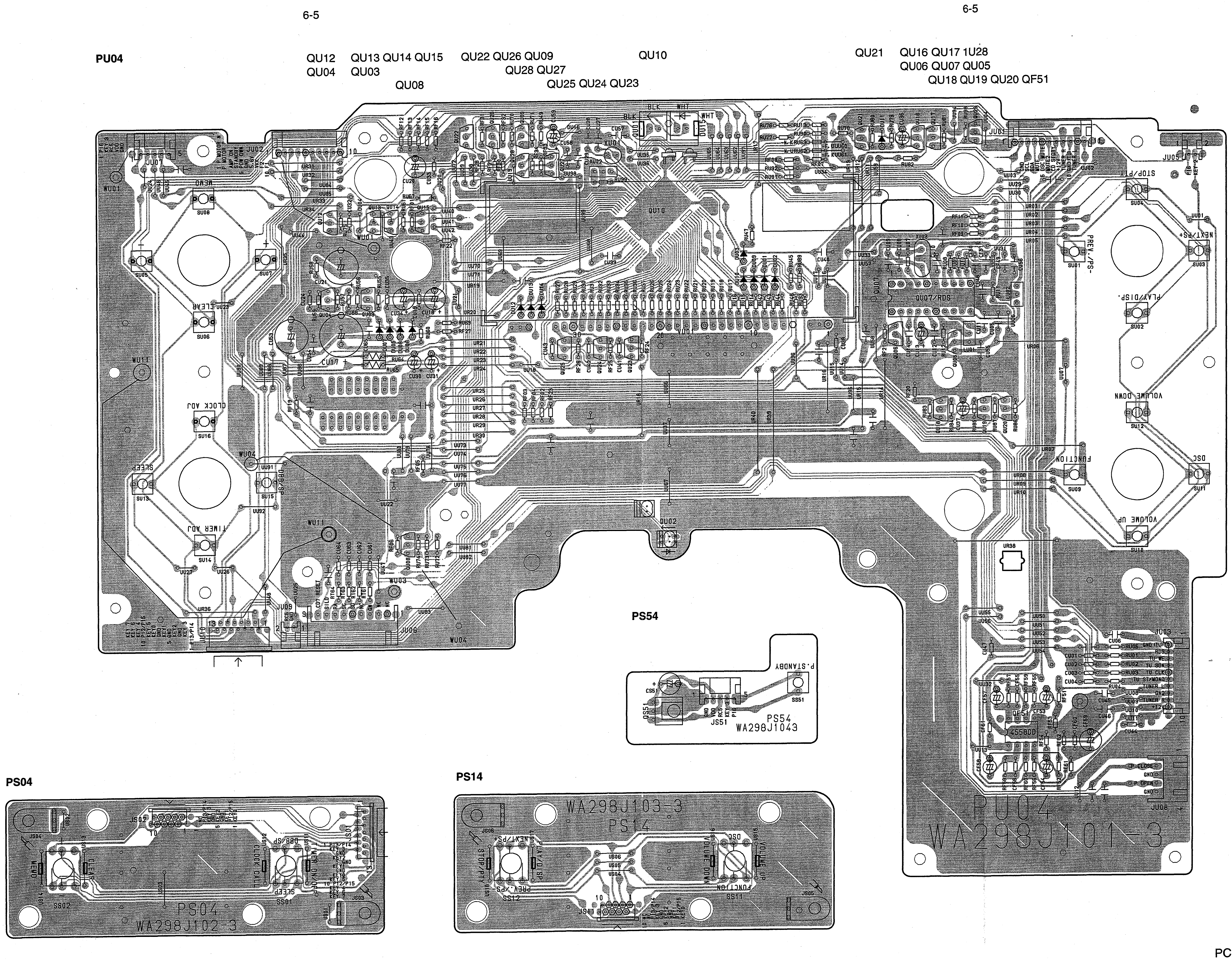
**P804**


P804
WA298J2044
220V
110V
FB01
RB01
JB01
JB02
SB01
UB01
UB02

**PH04**


PH04
JH01
JH02
WA298J2064-5

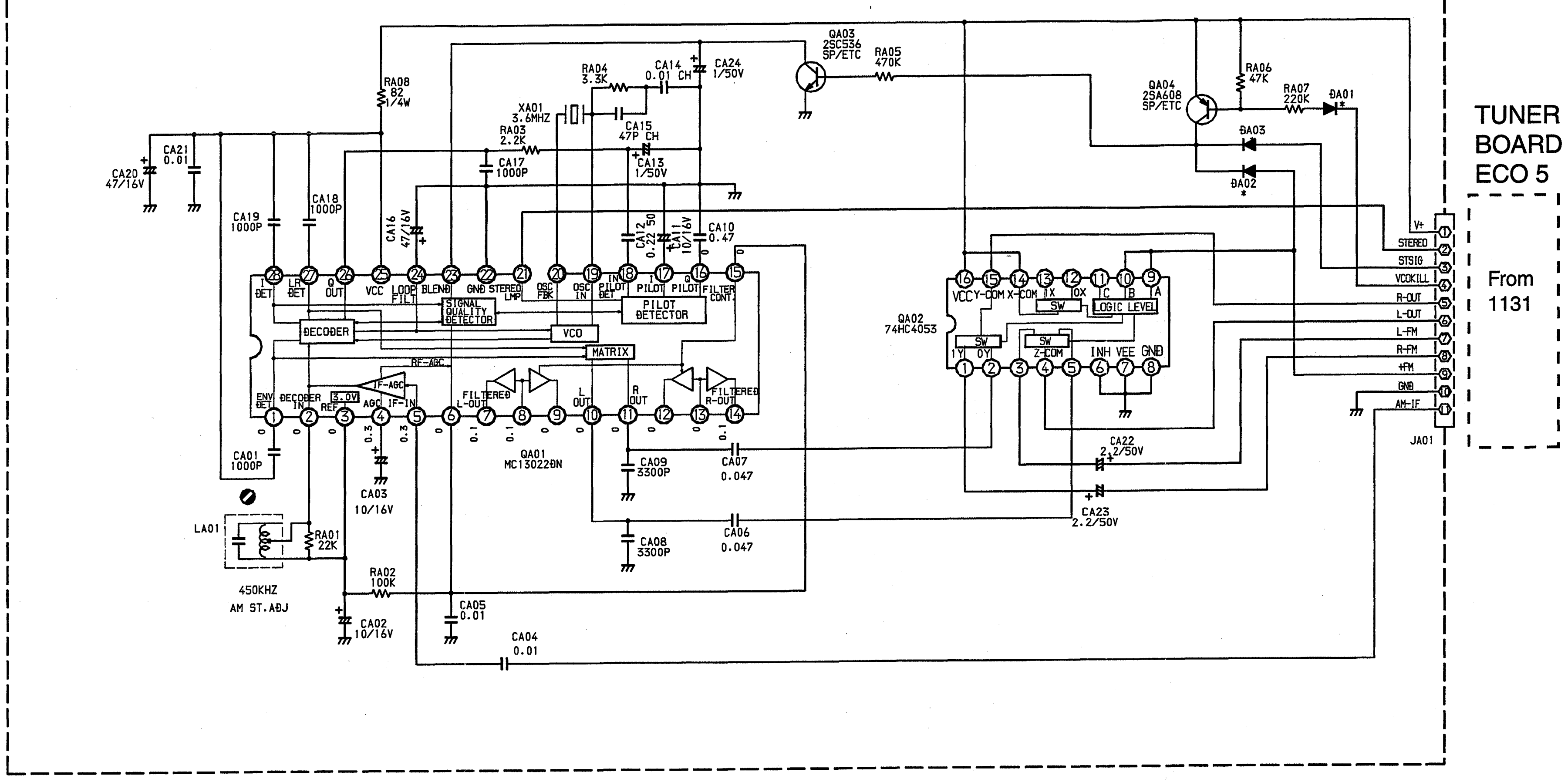

FL
VU01
MUTE2 CONT.
MUTE CONT.
OPEN SENSOR
QU01 WAVE FORM (PUT FINGER ON SENSOR LENS)
(NO FINGER ON SENSOR LENS)
QU15 WAVE FORM
QU10 TMP87C571F
QU07 SAA6588S
RDS_DECODER
[RDS] /2 ONLY
TUNER AMP
QF51 4558DD
CD BOARD NAMI 8
TUNER BOARD TUNER 95 or ECO5
WU09 TO JX01
W701 TO J810
WU02 TO J203
TU.L
GND
TU.R
+12V
CDOFF
MUTE2
SCMUTE
MUTE
SDA
SCL
P MOTOR N
P MOTOR P
AMP ON
STANDBY
POW DWN
5.6V
VKK
F2
F1
CDS RESET
SILD
RAB
NC
+12V
TUNER R
TUNER L
ST/MONO
CLOCK
DATA
ENABLE
RDS
U ONLY
WU03
JU03
WA298J1023
PS04 [RLS]
SLEEP
TIMER ON/OFF
BASS+SP
CLOCK CALL
SCAN DOWN
CLEAR
SCAN UP
MEMO
SS01
SS02
WA298J1033
PS14 [RLS]
FUNCTION SELECT
VOL-UP
SOUND CONTROL
VOL-DOWN
SS11
PREV REW PRESET D
PLAY/PAUSE DISPLAY
NEXT PRESET-UP
STOP PTY
SS12
PRESET DOWN
PTY STOP
PRESET-UP
DISPLAY
MEMO
SCAN UP
CLER
TIMER-SET/ADJ
BASS+SP
CLOCK-SET/ADJ
SLEEP
PS64
[RLS] PS64 WA298J1053
DOOR OPEN/CLOSE
SS61
WA298J105-3
POWER STANDBY
[RLS] PS54 WA298J1043
SS51
GEAR ASSY
CLOSE SW (SS21)
OPEN SW (SS22)
DOOR CLOSE
DOOR OPEN
WU02 TO P704, W802
QU10 #29 WAVE FORM (SENSOR ON)
QU10 #13 WAVE FORM
QU10 #11 WAVE FORM
QU10 #29 WAVE FORM (SENSOR OFF)
QU10 #30 WAVE FORM
QU10 # 39-65 WAVE FORM
QU07 #4 WAVE FORM
QU07 #5 WAVE FORM
[RMC] PU04
WA298J1013

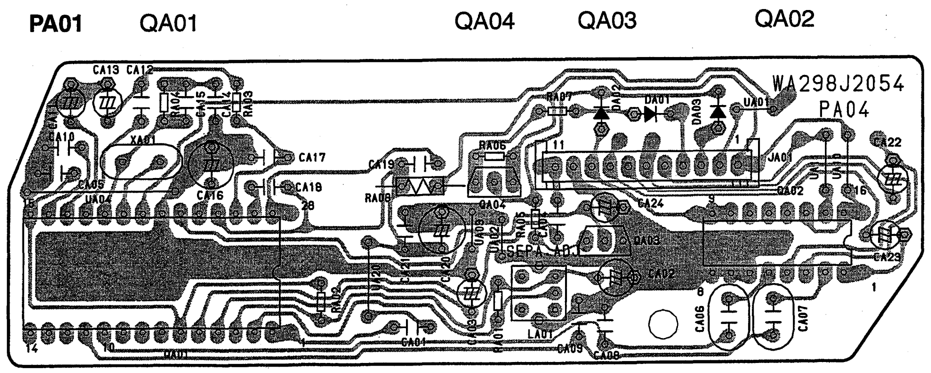

6-5
6-5
PU04
QU12
QU04
QU13 QU14 QU15
QU03
QU08
QU22 QU26 QU09
QU28 QU27
QU25 QU24 QU23
QU10
QU21
QU16 QU17 1U28
QU06 QU07 QU05
QU18 QU19 QU20 QF51
PU04
WA298J101-3
PS54
P.STANDBY
PS54
WA298J1043
PS04
PS04
WA298J102-3
PS14
WA298J103-3
PS14

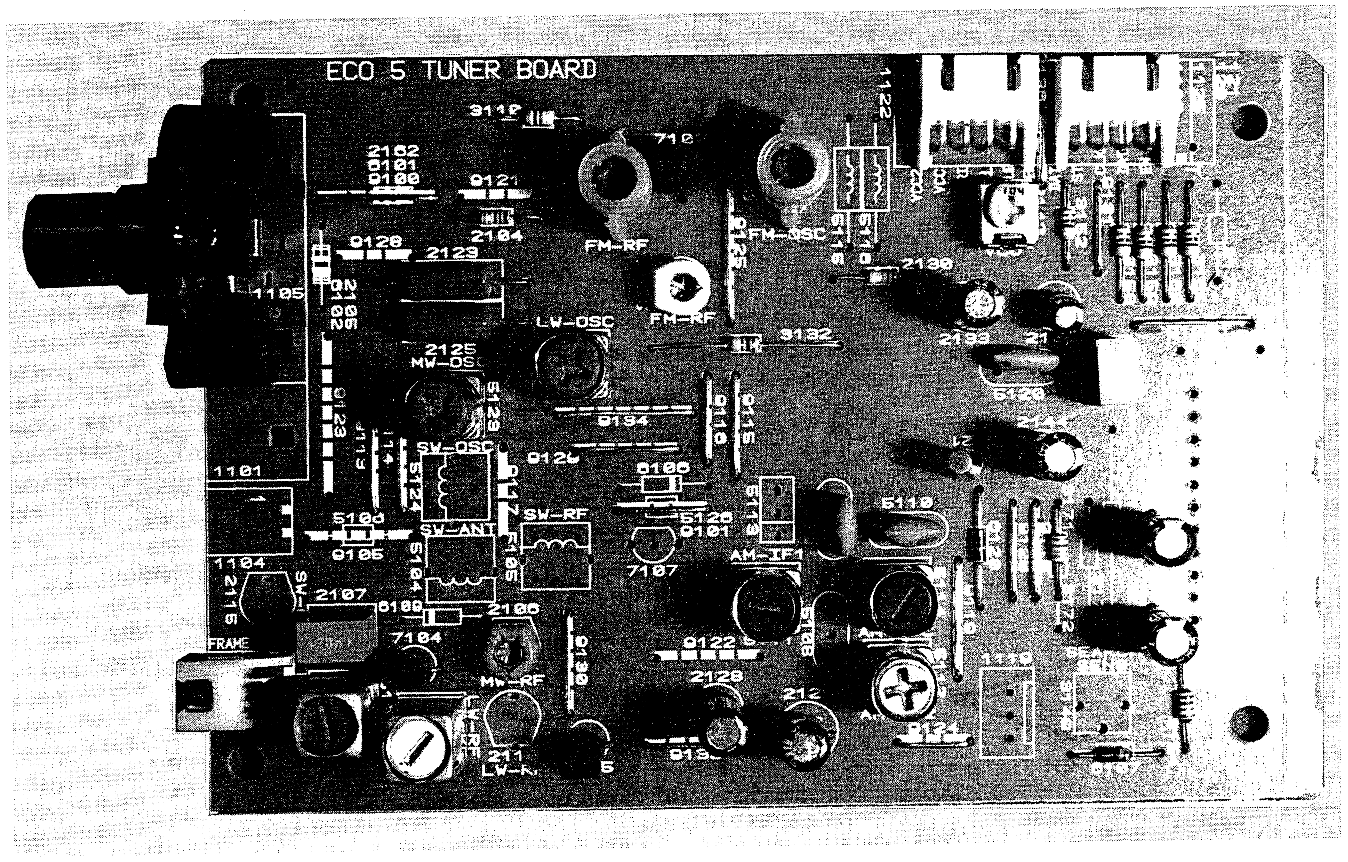
# PA04 [F] VERSION

WA298J2054 [RAS]

## AM STEREO


QA01
MC13022BN
QA02
74HC4053
QA03
2SC536
SP/ETC
QA04
2SA608
SP/ETC
RA05
470K
RA06
47K
RA07
220K
DA01
DA02
DA03
RA08
82
1/4W
RA04
3.3K
CA14
0.01 CH
CA24
1/50V
XA01
3.6MHZ
CA15
47P CH
RA03
2.2K
CA17
1000P
CA13
1/50V
CA20
47/16V
CA21
0.01
CA19
1000P
CA18
1000P
CA16
47/16V
CA12
0.22 50
CA11
10/16V
CA10
0.47
DET
LR DET
Q OUT
VCC
LOOP FILT
BLEND
GND
STEREO LMP
OSC FBK
OSC IN
IN PILOT DET
PILOT
PILOT
FILTER CONT
SIGNAL QUALITY DETECTOR
PILOT DETECTOR
DECODER
VCO
MATRIX
RF-AGC
IF-AGC
ENV DET
DECODER IN
REF
3.0V
AGC
IF-IN
FILTERED L-OUT
L OUT
R OUT
FILTERED R-OUT
CA01
1000P
CA03
10/16V
CA09
3300P
CA07
0.047
CA08
3300P
CA06
0.047
LA01
450KHZ
AM ST.ADJ
RA01
22K
RA02
100K
CA02
10/16V
CA05
0.01
CA04
0.01
CA22
2.2/50V
CA23
2.2/50V
VCC
Y-COM
X-COM
1X
0X
C
B
A
SW
LOGIC LEVEL
1Y
0Y
Z-COM
INH
VEE
GND
V+
STEREO
STSIG
VCOKILL
R-OUT
L-OUT
L-FM
R-FM
+FM
GND
AM-IF
JA01
TUNER
BOARD
ECO 5
From
1131


PA01
QA01
QA04
QA03
QA02
WA298J2054
PA04
CA13
CA12
XA01
CA17
CA19
CA18
RA08
RA06
CA16
DA01
DA02
DA03
QA04
QA03
QA02
JA01
CA22
CA23
CA24
CA06
CA07
LA01
CA01


ECO 5 TUNER BOARD
FM-RF
FM-OSC
LW-OSC
MW-OSC
SW-OSC
SW-RF
SW-ANT
AM-IF1
MW-RF
LW-RF
1101
1104
1105
1122
FRAME

# TUNER BOARD ECO5

### TABLE OF CONTENTS

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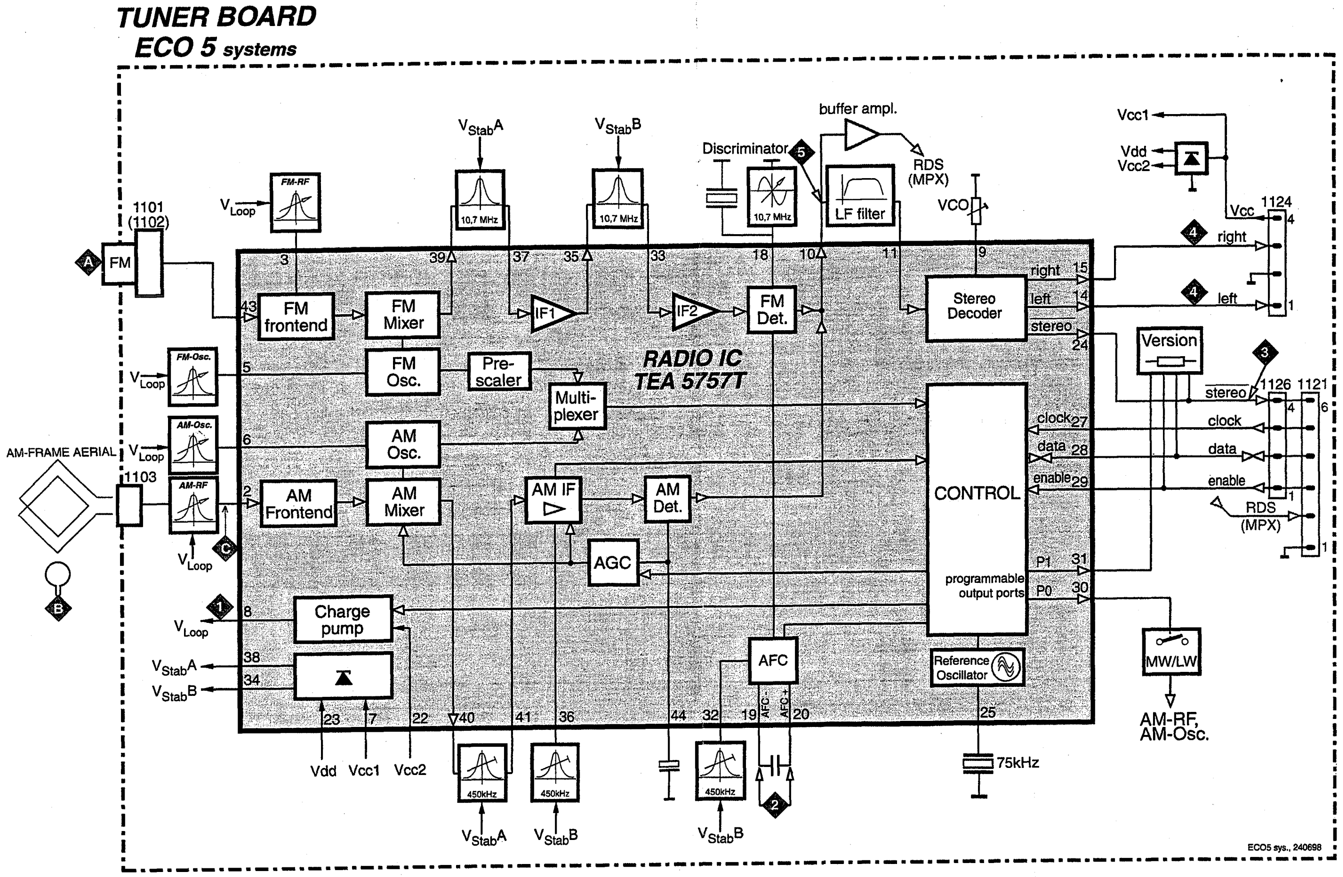
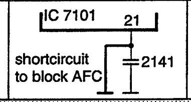
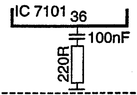
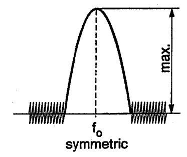
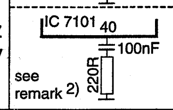
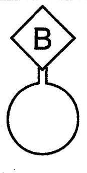
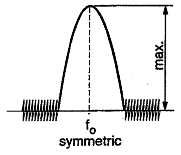
Adjustmant table ........ 7B-2
Component layout........ 7B-3
Circuit diagram........ 7B-4
Parts list ........ 7B-5

## BLOCK DIAGRAM


TUNER BOARD
ECO 5 systems
RADIO IC
TEA 5757T
FM frontend
FM Mixer
FM Osc.
Pre-scaler
Multi-plexer
AM Osc.
AM Frontend
AM Mixer
AM IF
AM Det.
AGC
IF1
IF2
FM Det.
Stereo Decoder
CONTROL
programmable output ports
Charge pump
AFC
Reference Oscillator
Discriminator
buffer ampl.
RDS (MPX)
LF filter
VCO
Version
MW/LW
AM-RF, AM-Osc.
FM-RF
FM-Osc.
AM-Osc.
AM-RF
10,7 MHz
450kHz
75kHz
AM-FRAME AERIAL
FM
1101 (1102)
1103
1124
1126
1121
Vcc1
Vdd
Vcc2
Vcc
right
left
stereo
clock
data
enable
P1
P0
Vdd Vcc1 Vcc2
A
B
C
1
2
3
4
5
ECO5 sys., 240698

## TUNER ADJUSTMENT TABLE ( ECO5 FM/MW- and FM/MW/LW - versions with AM-frame aerial )

| Waverange | Input frequency | Input | Tuned to | Adjust | Output | Scope/Voltmeter | |
|---|---|---|---|---|---|---|---|
| *VARICAP ALIGNMENT* | | | | | | | |
| **FM**<br>87.5 - 108MHz<br>(65.81 - 74, 87.5 - 108MHz) | | | 108MHz | 5130 | 1 | 8V ±0.2V | |
| | | | 87.5MHz<br>(65.81MHz) | check | | 4.3V ±0.5V<br>(1.2V ±0.5V) | |
| **MW**<br>FM/AM-version, 10kHz grid<br>530 - 1700kHz | | | 1700kHz | 5123 | | 8V ±0.2V | |
| | | | 530kHz | check | | 1.1V ±0.4V | |
| FM/MW-version, 9kHz grid<br>531 - 1602kHz | | | 1602kHz | 5123 | | 6.9V ±0.2V | |
| | | | 531kHz | check | | 1.1V ±0.4V | |
| **LW**<br>153 - 279kHz | | | 279kHz | 5122 | | 8V ±0.2V | |
| | | | 153kHz | check | | 1.1V ±0.4V | |
| **MW**<br>FM/MW/LW- version, 9kHz grid<br>531 - 1602kHz | | | 1602kHz | 5123 | | 8V ±0.2V | |
| | | | 531kHz | check | | 1.1V ±0.4V | |
| *FM IF* | | | | | | | |
| **FM** | 10.7MHz, 50mV<br>continuous wave | F |  | 5119 | 2 | 0 ± 3 mV DC | |
| *FM RF* | | | | | | | |
| **FM**<br>87.5 - 108MHz<br>(65.81 - 74, 87.5 - 108MHz) | 108MHz | A<br>mod=1kHz<br>Δf=±22.5kHz | 108MHz | 2155 | 4 | MAX | ↕ |
| | 87.5MHz<br>(65.81MHz) | | 87.5MHz<br>(65.81MHz) | 5131 | | | |
| *VCO* | | | | | | | |
| **FM** | 98MHz, 1mV<br>continuous wave | A | 98MHz | 3142 | 3 | 152kHz ±1kHz [1] | |
| *AM IF* | | | | | | | |
| **MW** | 450kHz<br>connect pin 6 of IC 7101 (AM Osc.) with short wire to ground (pin 4) | C<br>Δf=±15kHz<br>$V_{RF}$ = 3mV |  | 5111 | 4 |  | |
| | | |  | 5112 | | | |
| *AM AFC*<br>**MW** | | C<br>continuous wave<br>$V_{RF}$ = 10mV | | 5114 | 2 | 0 ± 2 mV DC | |
| *AM RF* [3] | | | | | | | |
| **MW** [4]<br>FM/MW/LW- and FM/MW-version<br>( 9kHz grid)<br>531 - 1602kHz | 1494kHz |  <br>Δf = ±30kHz<br>$V_{RF}$ as low as possible | 1494kHz | 2106 | 4 |  | ↕ |
| | 558kHz | | 558kHz | 5102 | | | |
| **LW** | 198kHz | | 198kHz | 5103 | | | |
| **MW**<br>FM/AM-version, 10kHz grid<br>530 - 1700kHz | 1500kHz | | 1500kHz | 2106 | | | ↕ |
| | 560kHz | | 560kHz | 5102 | | | |

ECO5, discr. coil, 090797

Use service test program. By selecting the TUNER TEST test frequencies will be stored as preset frequencies automatically.

[1] If sensitivity of frequency counter is too low adjust to max. channel separation (input signal: stereo left 90% + 9%, adjust output on right channel to minimum)

[2] RC network serves for damping the IF-filter while adjusting the other one.

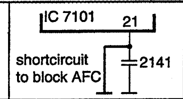
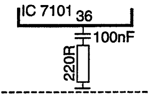
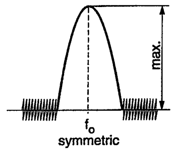
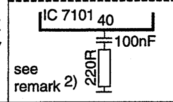
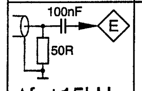
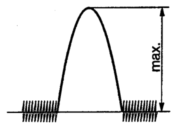
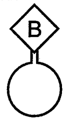
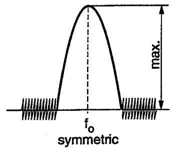
[3] For AM RF adjustments the original frame antenna has to be used !

[4] MW has to be aligned before LW.

↕ Repeat

---

## TUNER ADJUSTMENT TABLE ( ECO5 FM/MW- stereo versions with AM-frame aerial )

| Waverange | Input frequency | Input | Tuned to | Adjust | Output | Scope/Voltmeter | |
|---|---|---|---|---|---|---|---|
| *VARICAP ALIGNMENT* | | | | | | | |
| **FM**<br>87.5 - 108MHz | | | 108MHz | 5130 | 1 | 8V ±0.2V | |
| | | | 87.5MHz | check | | 4.3V ±0.5V | |
| **FM** Japan<br>76 - 90MHz plus<br>Ch1 95.75MHz, Ch2 101,75MHz,<br>Ch3 107.75MHz | | | 107,75MHz | 5130 | | 8V ±0.2V | |
| | | | 76MHz | check | | 2.4V ±0.5V | |
| **MW**<br>FM/AM-version, 10kHz grid<br>530 - 1700kHz | | | 1700kHz | 5123 | | 8V ±0.2V | |
| | | | 530kHz | check | | 1.1V ±0.4V | |
| **MW**<br>FM/MW-version, 9kHz grid<br>531 - 1602kHz | | | 1602kHz | 5123 | | 6.9V ±0.2V | |
| | | | 531kHz | check | | 1.1V ±0.4V | |
| *FM IF* | | | | | | | |
| **FM** | 10.7MHz, 50mV<br>continuous wave | F |  | 5119 | 2 | 0 ± 3 mV DC | |
| *FM RF* | | | | | | | |
| **FM**<br>87.5 - 108MHz | 108MHz | A<br>mod=1kHz<br>Δf=±22.5kHz | 108MHz | 2155 | 5 | MAX | ↕ |
| | 87.5MHz | | 87.5MHz | 5131 | | | |
| **FM** Japan<br>76 - 90MHz plus<br>Ch1 95.75MHz, Ch2 101,75MHz,<br>Ch3 107.75MHz | 107.75MHz | | 107.75MHz | 2155 | | | ↕ |
| | 76MHz | | 76MHz | 5131 | | | |
| *VCO* | | | | | | | |
| **FM** | 98MHz, 1mV<br>(83MHz for Japan)<br>continuous wave | A | 98MHz<br>(83MHz for Japan) | 3142 | 3 | 152kHz ±1kHz [1] | |
| *AM IF* | | | | | | | |
| **MW** | 450kHz<br>connect pin 6 of IC 7101 (AM Osc.) with short wire to ground (pin 4) | C<br>Δf=±15kHz<br>$V_{RF}$ = 3mV |  | 5111 | 5 |  | |
| | | |  | 5112 | | | |
| *AM AFC*<br>**MW** | | C<br>continuous wave<br>$V_{RF}$ = 10mV | | 5114 | 2 | 0 ± 2 mV DC | |
| *IF stereo module*<br>**MW** | |  <br>Δf=±15kHz<br>$V_{RF}$ = 1mV | | 5240 | 4 |  | |
| *AM RF* [3] | | | | | | | |
| **MW**<br>FM/MW-version, 9kHz grid<br>531 - 1602kHz | 1494kHz |  <br>Δf = ±30kHz<br>$V_{RF}$ as low as possible | 1494kHz | 2106 | 4 |  | ↕ |
| | 558kHz | | 558kHz | 5102 | | | |
| **MW**<br>FM/AM-version, 10kHz grid<br>530 - 1700kHz | 1500kHz | | 1500kHz | 2106 | | | ↕ |
| | 560kHz | | 560kHz | 5102 | | | |

ECO5 AM stereo, discr.coil 090797

Use service test program. By selecting the TUNER TEST test frequencies will be stored as preset frequencies automatically.

[1] If sensitivity of frequency counter is too low adjust to max. channel separation (input signal: stereo left 90% + 9%, adjust output on right channel to minimum)

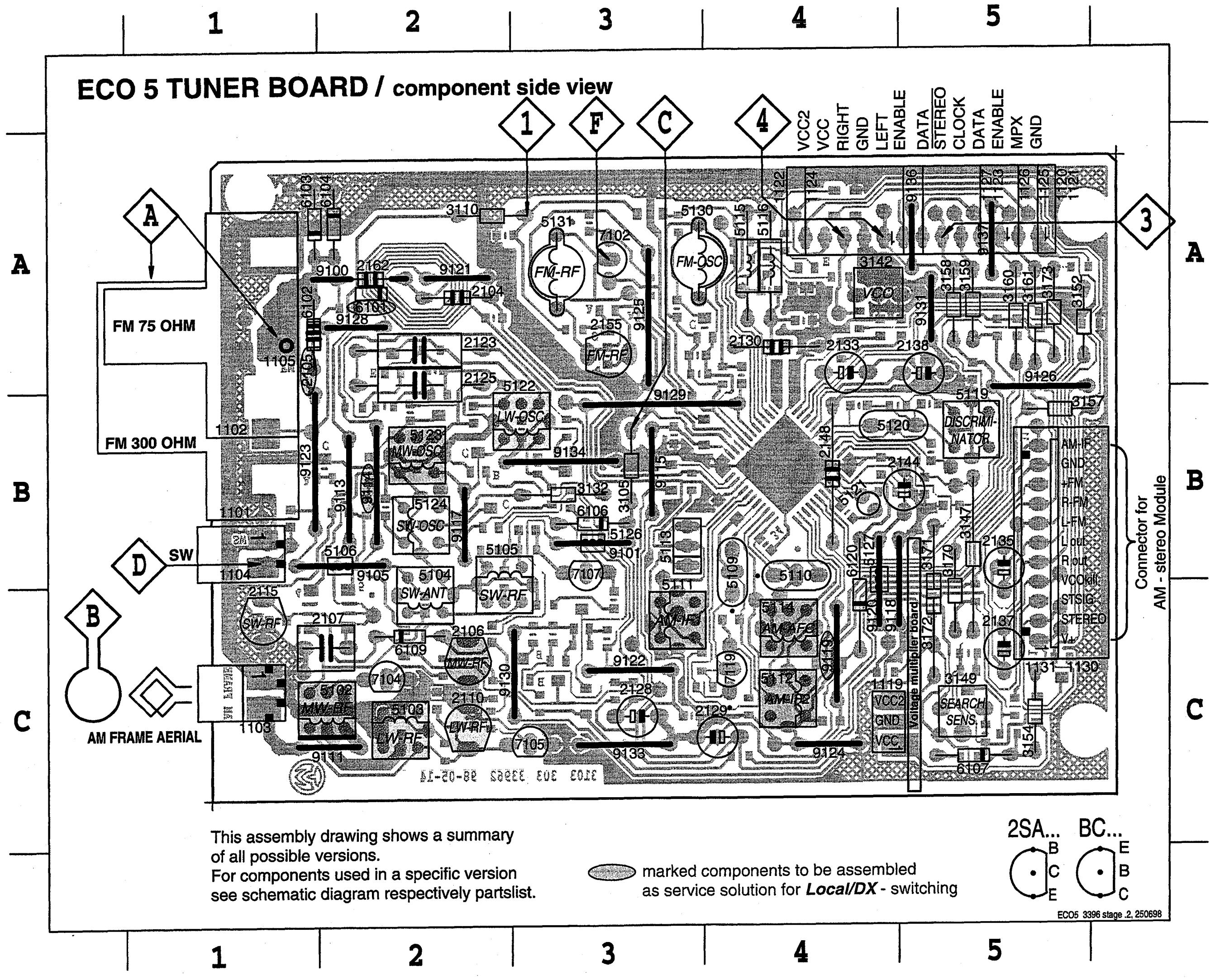
[2] RC network serves for damping the IF-filter while adjusting the other one.

[3] For AM RF adjustments the original frame antenna has to be used !

↕ Repeat

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1101 | A1 | 2106 | C2 | 2137 | C5 | 3149 | C5 | 3173 | A5 | 5114 | C4 | 5130 | A3 | 7104 | C2 | 9117 | B2 | 9129 | B3 |
| 1102 | A1 | 2107 | C2 | 2138 | A5 | 3152 | A5 | 5102 | C2 | 5115 | A4 | 5131 | A3 | 7105 | C3 | 9118 | B4 | 9130 | C3 |
| 1103 | C1 | 2110 | C2 | 2144 | B5 | 3154 | C5 | 5103 | C2 | 5116 | A4 | 6101 | A2 | 7107 | B3 | 9119 | C4 | 9131 | A5 |
| 1104 | B1 | 2115 | C1 | 2148 | B4 | 3157 | B5 | 5104 | C2 | 5119 | B5 | 6102 | A1 | 7119 | C4 | 9120 | B4 | 9133 | C3 |
| 1105 | A1 | 2123 | A2 | 2155 | A3 | 3158 | A5 | 5105 | B2 | 5120 | B4 | 6103 | A1 | 9100 | A2 | 9121 | A2 | 9134 | B3 |
| 1119 | C5 | 2125 | A2 | 2162 | A2 | 3159 | A5 | 5106 | B2 | 5121 | B4 | 6104 | A2 | 9101 | B3 | 9122 | C3 | 9136 | A5 |
| 1120 | A5 | 2128 | C3 | 3105 | B3 | 3160 | A5 | 5109 | B4 | 5122 | B3 | 6106 | B3 | 9105 | B2 | 9123 | B1 | 9137 | A5 |
| 1130 | B5 | 2129 | C4 | 3110 | A2 | 3161 | A5 | 5110 | B4 | 5123 | B2 | 6107 | C5 | 9111 | C2 | 9124 | C4 |  |  |
| 1131 | B5 | 2130 | A4 | 3132 | B3 | 3170 | C5 | 5111 | C3 | 5124 | B2 | 6109 | C2 | 9113 | B2 | 9125 | A3 |  |  |
| 2104 | A2 | 2133 | A4 | 3142 | A4 | 3171 | C5 | 5112 | C4 | 5126 | B3 | 6120 | C4 | 9114 | B2 | 9126 | B5 |  |  |
| 2105 | A1 | 2135 | B5 | 3147 | B5 | 3172 | C5 | 5113 | B3 | 5127 | B4 | 7102 | A3 | 9115 | B3 | 9128 | A2 |  |  |

## ECO 5 TUNER BOARD / component side view

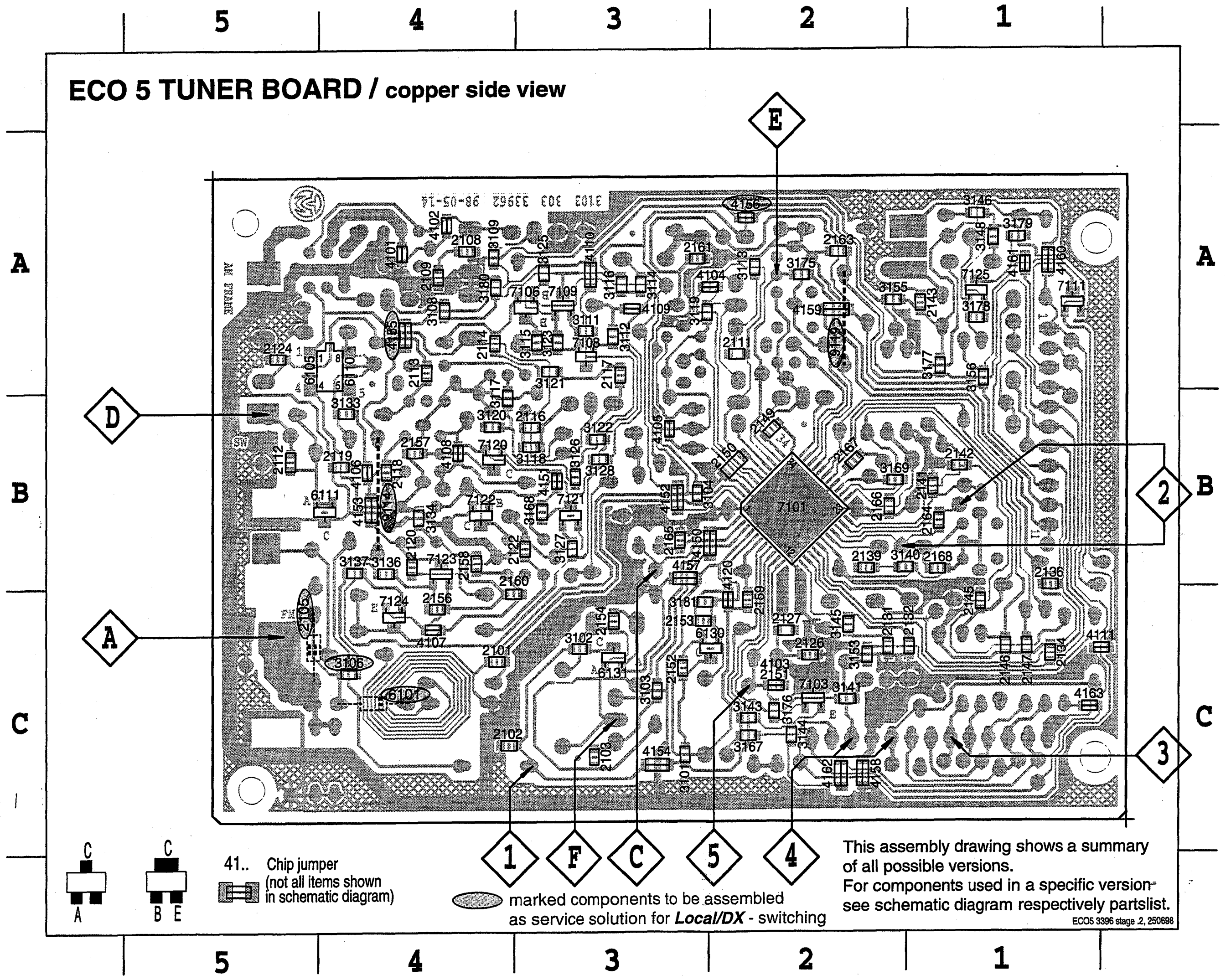

1
2
3
4
5
A
B
C
1
F
C
4
3
A
D
B
VCC2
VCC
RIGHT
GND
LEFT
ENABLE
DATA
STEREO
CLOCK
DATA
ENABLE
MPX
GND
FM 75 OHM
FM 300 OHM
SW
AM FRAME AERIAL
FM-RF
FM-OSC
FM-RF
LW-OSC
MW-OSC
SW-OSC
SW-ANT
SW-RF
SW-RF
MW-RF
LW-RF
LW-RF
AM-IF
AM-IF
AM-IF
DISCRIMI-NATOR
SEARCH SENS.
VCC2
GND
VCC
AM-IF
GND
+FM
R-FM
L-FM
L out
R out
VCOkill
STSIG
STEREO
Va
Connector for AM - stereo Module
voltage multiplier board
3103 303 33962 98-02-14
2SA...
BC...
B
C
E
E
B
C
ECO5 3396 stage 2, 250698

This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

marked components to be assembled as service solution for ***Local/DX*** - switching

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2101 | C4 | 2118 | B4 | 2139 | B2 | 2153 | C3 | 2166 | B2 | 3112 | A3 | 3123 | A3 | 3143 | C2 | 3175 | A2 | 4105 | B3 | 4153 | B4 | 6105 | A4 | 7120 | B4 |
| 2102 | C4 | 2119 | B4 | 2141 | B1 | 2154 | C3 | 2167 | B2 | 3113 | A2 | 3125 | A3 | 3144 | C2 | 3176 | C2 | 4106 | B4 | 4154 | C3 | 6110 | A4 | 7121 | B3 |
| 2103 | C3 | 2120 | B4 | 2142 | B1 | 2156 | C4 | 2168 | B1 | 3114 | A3 | 3126 | B3 | 3145 | C2 | 3177 | A1 | 4107 | C4 | 4155 | A4 | 6111 | B4 | 7122 | B4 |
| 2108 | A4 | 2122 | B3 | 2143 | A1 | 2157 | B4 | 3101 | C3 | 3115 | A3 | 3127 | B3 | 3146 | A1 | 3178 | A1 | 4108 | B4 | 4156 | A2 | 6130 | C2 | 7123 | B4 |
| 2109 | A4 | 2124 | A5 | 2145 | C1 | 2158 | B4 | 3102 | C3 | 3116 | A3 | 3128 | B3 | 3148 | A1 | 3179 | A1 | 4109 | A3 | 4157 | B3 | 6131 | C3 | 7124 | C4 |
| 2111 | A2 | 2126 | C2 | 2146 | C1 | 2159 | C2 | 3103 | C3 | 3117 | B4 | 3133 | B4 | 3153 | C2 | 3180 | A4 | 4110 | A3 | 4158 | C2 | 7101 | B2 | 7125 | A1 |
| 2112 | B5 | 2127 | C2 | 2147 | C1 | 2160 | C4 | 3104 | B3 | 3118 | B3 | 3134 | B4 | 3155 | A2 | 3181 | C3 | 4111 | C1 | 4159 | A2 | 7103 | C2 |  |  |
| 2113 | A4 | 2131 | C2 | 2149 | B2 | 2161 | A3 | 3106 | C4 | 3119 | A3 | 3136 | B4 | 3156 | A1 | 4101 | A4 | 4120 | C2 | 4160 | A1 | 7106 | A3 |  |  |
| 2114 | A4 | 2132 | C1 | 2150 | B2 | 2163 | A2 | 3108 | A4 | 3120 | B4 | 3137 | B4 | 3167 | C2 | 4102 | A4 | 4150 | B2 | 4161 | A1 | 7108 | A3 |  |  |
| 2116 | B3 | 2134 | C1 | 2151 | C2 | 2164 | B1 | 3109 | A4 | 3121 | A3 | 3140 | B2 | 3168 | B3 | 4103 | C2 | 4151 | B3 | 4162 | C1 | 7109 | A3 |  |  |
| 2117 | A3 | 2136 | B1 | 2152 | C3 | 2165 | B3 | 3111 | A3 | 3122 | B3 | 3141 | C2 | 3169 | B2 | 4104 | A2 | 4152 | B3 | 4163 | C1 | 7111 | A1 |  |  |

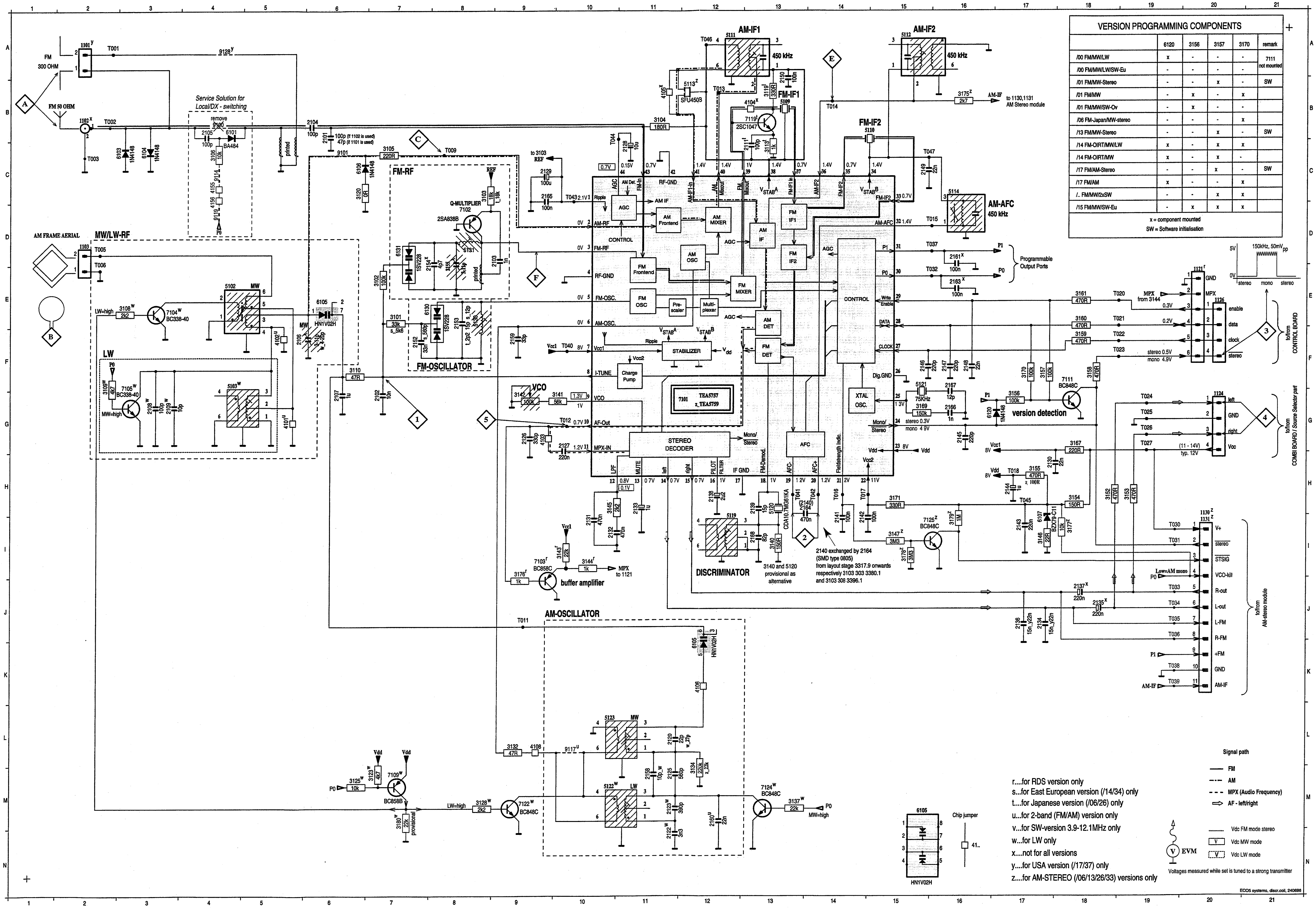
## ECO 5 TUNER BOARD / copper side view


5
4
3
2
1
A
B
C
E
D
2
A
3
1
F
C
5
4
3103 303 33962 98-05-14
7101
C
A
C
B E
41..
Chip jumper
(not all items shown in schematic diagram)
ECO5 3396 stage 2, 250698

marked components to be assembled as service solution for ***Local/DX*** - switching

This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

# TUNER BOARD ECO5 / Systems


FM 300 OHM
FM 50 OHM
Service Solution for Local/DX - switching
remove 9100
AM FRAME AERIAL
MW/LW-RF
LW
FM-RF
Q-MULTIPLIER 7102
FM-OSCILLATOR
VCO
AM-IF1
AM-IF2
FM-IF1
FM-IF2
AM-AFC 450 kHz
450 kHz
AGC
AM Frontend
AM MIXER
AM IF
FM IF1
FM IF2
CONTROL
AM OSC
FM Frontend
FM MIXER
FM OSC
Pre-scaler
Multi-plexer
AM DET
FM DET
STABILIZER
Charge Pump
7101 TEA5757 z_TEA5759
STEREO DECODER
AFC
XTAL OSC.
DISCRIMINATOR
2140 exchanged by 2164 (SMD type 0805) from layout stage 3317.9 onwards respectively 3103 303 3380.1 and 3103 308 3396.1
3140 and 5120 provisional as alternative
buffer amplifier
version detection
Programmable Output Ports
to/from CONTROL BOARD
to/from COMBI BOARD / Source Selector part
to/from AM-stereo module
to 1130,1131 AM Stereo module
AM-OSCILLATOR
150kHz, 50mVpp
5V
0V
stereo
mono
stereo
HN1V02H
Chip jumper
41..
Signal path
FM
AM
MPX (Audio Frequency)
AF - left/right
Vdc FM mode stereo
Vdc MW mode
Vdc LW mode
EVM

| VERSION PROGRAMMING COMPONENTS | 6120 | 3156 | 3157 | 3170 | remark |
|---|---|---|---|---|---|
| /00 FM/MW/LW | x | - | - | - | 7111 not mounted |
| /00 FM/MW/LW/SW-Eu | - | - | - | - | |
| /01 FM/MW-Stereo | - | - | x | - | SW |
| /01 FM/MW | - | x | - | x | |
| /01 FM/MW/SW-Ov | - | x | - | - | |
| /06 FM-Japan/MW-stereo | - | - | - | x | |
| /13 FM/MW-Stereo | - | - | x | - | SW |
| /14 FM-OIRT/MW/LW | x | - | x | x | |
| /14 FM-OIRT/MW | x | - | x | - | |
| /17 FM/AM-Stereo | - | - | x | - | SW |
| /17 FM/AM | x | - | - | x | |
| /.. FM/MW/2xSW | - | - | x | x | |
| /15 FM/MW/SW-Eu | - | x | x | x | |

x = component mounted
SW = Software initialisation

r....for RDS version only
s...for East European version (/14/34) only
t....for Japanese version (/06/26) only
u...for 2-band (FM/AM) version only
v...for SW-version 3.9-12.1MHz only
w...for LW only
x....not for all versions
y....for USA version (/17/37) only
z....for AM-STEREO (/06/13/26/33) versions only

Voltages measured while set is tuned to a strong transmitter

ECO5 systems, discr.coil, 240698

| | |
|---|---|
| 1101 | A 1 |
| 1102 | B 2 |
| 1103 | D 2 |
| 1121 | E20 |
| 1124 | G20 |
| 1126 | E20 |
| 1130 | I20 |
| 1131 | I20 |
| 2101 | C 6 |
| 2102 | G 7 |
| 2103 | D 9 |
| 2104 | B 6 |
| 2106 | F 5 |
| 2107 | G 6 |
| 2108 | G 3 |
| 2109 | G 3 |
| 2111 | C13 |
| 2120 | L11 |
| 2122 | N11 |
| 2123 | M11 |
| 2125 | M11 |
| 2126 | G 9 |
| 2127 | G10 |
| 2128 | C11 |
| 2129 | C 9 |
| 2130 | H17 |
| 2131 | I10 |
| 2132 | I10 |
| 2133 | H11 |
| 2134 | J17 |
| 2135 | J18 |
| 2136 | J17 |
| 2137 | J18 |
| 2138 | H12 |
| 2139 | H13 |
| 2140 | H14 |
| 2141 | H14 |
| 2142 | H14 |
| 2143 | I17 |
| 2144 | H17 |
| 2145 | G16 |
| 2146 | F15 |
| 2147 | F16 |
| 2148 | F16 |
| 2149 | C15 |
| 2150 | B13 |
| 2152 | F 7 |
| 2153 | E 8 |
| 2154 | E 7 |
| 2155 | D 8 |
| 2158 | M11 |
| 2159 | F 9 |
| 2160 | M12 |
| 2161 | D16 |
| 2163 | E16 |
| 2164 | H14 |
| 2165 | C 9 |
| 2166 | G16 |
| 2167 | F16 |
| 2168 | I 13 |
| 3101 | E 7 |
| 3102 | E 7 |
| 3103 | C 8 |
| 3104 | B11 |
| 3105 | C 7 |
| 3108 | E 3 |
| 3109 | F 2 |
| 3110 | F 6 |
| 3113 | C13 |
| 3119 | B13 |
| 3120 | C 6 |
| 3123 | M 7 |
| 3125 | M 6 |
| 3128 | M 8 |
| 3132 | L 9 |
| 3134 | M12 |
| 3137 | M13 |
| 3140 | I13 |
| 3141 | G10 |
| 3142 | G 9 |
| 3143 | I10 |
| 3144 | I10 |
| 3145 | H10 |
| 3146 | I17 |
| 3147 | I15 |
| 3152 | H18 |
| 3153 | H19 |
| 3154 | H18 |
| 3155 | H17 |
| 3156 | G17 |
| 3157 | F17 |
| 3158 | F18 |
| 3159 | F18 |
| 3160 | E18 |
| 3161 | E18 |
| 3167 | G18 |
| 3169 | G15 |
| 3170 | F17 |
| 3171 | H15 |
| 3175 | B16 |
| 3176 | J 9 |
| 3177 | I18 |
| 3178 | I15 |
| 3179 | I16 |
| 3180 | M7 |
| 4101 | G 5 |
| 4102 | F 5 |
| 4103 | G 9 |
| 4104 | B13 |
| 4105 | B11 |
| 4106 | K12 |
| 4108 | L 9 |
| 5102 | E 4 |
| 5103 | F 4 |
| 5109 | B13 |
| 5110 | B14 |
| 5111 | A13 |
| 5112 | A15 |
| 5113 | B12 |
| 5114 | C16 |
| 5119 | I 12 |
| 5120 | H13 |
| 5121 | F15 |
| 5122 | M11 |
| 5123 | L11 |
| 5130 | E 8 |
| 5131 | D 8 |
| 6103 | C 2 |
| 6104 | C 3 |
| 6105 | K12 |
| 6105 | E 6 |
| 6106 | C 6 |
| 6107 | H17 |
| 6120 | G16 |
| 6130 | E 7 |
| 6131 | D 7 |
| 7101 | G11 |
| 7102 | D 8 |
| 7103 | I 9 |
| 7104 | E 3 |
| 7105 | F 2 |
| 7109 | M 7 |
| 7111 | F18 |
| 7119 | B13 |
| 7122 | M 9 |
| 7124 | M13 |
| 7125 | I16 |
| 9100 | B 4 |
| 9101 | C 6 |
| 9117 | L10 |
| 9128 | A 4 |

## ELECTRICAL PARTSLIST *TUNER ECO5*

### MISCELLANEOUS

| | | | |
|---|---|---|---|
| 1101 | 4822 267 31505 | SOCKET 2-POLE CLICKFIT, 300Ω | only for /17 |
| 1102 | 4822 267 10283 | SOCKET COAX, IEC 75Ω | not for /17 |

### CAPACITORS

| | | | | | |
|---|---|---|---|---|---|
| 2101© | 5322 122 32531 | 100pF | 5% | 50V | not for /17 |
| 2101© | 5322 122 32452 | 47pF | 5% | 63V | only for /17 |
| 2102© | 4822 122 33177 | 10nF | 20% | 50V | |
| 2103© | 5322 122 34123 | 1nF | 10% | 50V | |
| 2104 | 4822 122 33195 | 100pF | 10% | 50V | |
| 2106 | 4822 125 60101 | 3-11pF | TRIMCAP. | | |
| 2107 | 4822 121 51319 | 1µF | 20% | 50V | |
| 2120© | 5322 122 32658 | 22pF | 5% | 50V | |
| 2125 | 4822 121 51381 | 560pF | 1% | 400V | |
| 2126© | 5322 122 31863 | 330pF | 5% | 50V | |
| 2127© | 4822 126 13473 | 220nF | 20% | 50V | |
| 2128 | 4822 124 41579 | 10µF | 20% | 50V | |
| 2129 | 4822 124 41584 | 100µF | 20% | 10V | |
| 2130 | 4822 126 11585 | 22nF | 20% | 50V | |
| 2131© | 4822 126 13482 | 470nF | 20% | 16V | |
| 2132© | 4822 126 13482 | 470nF | 20% | 16V | |
| 2133 | 4822 124 40242 | 1µF | 20% | 63V | |
| 2134© | 4822 126 13188 | 15nF | 5% | 63V | not for /17 |
| 2134© | 5322 122 32654 | 22nF | 10% | 63V | only for /17 |
| 2135 | 4822 124 40746 | 0,22µF | 20% | 63V | |
| 2136© | 4822 126 13188 | 15nF | 5% | 63V | not for /17 |
| 2136© | 5322 122 32654 | 22nF | 10% | 63V | only for /17 |
| 2137 | 4822 124 40746 | 0,22µF | 20% | 63V | |
| 2138 | 4822 124 41576 | 2,2µF | 20% | 50V | |
| 2139© | 4822 126 14236 | 15pF | 5% | 50V | |
| 2141© | 4822 126 10002 | 100nF | 20% | 50V | |
| 2142© | 4822 126 10002 | 100nF | 20% | 50V | |
| 2143© | 4822 126 13473 | 220nF | 20% | 50V | |
| 2144 | 4822 124 40242 | 1µF | 20% | 63V | |
| 2145© | 4822 122 33575 | 220pF | 5% | 50V | |
| 2146© | 4822 122 33575 | 220pF | 5% | 50V | |
| 2147© | 4822 122 33575 | 220pF | 5% | 50V | |
| 2148 | 4822 126 11585 | 22nF | 20% | 50V | |
| 2149© | 5322 122 32654 | 22nF | 10% | 63V | |
| 2150© | 4822 122 31947 | 100nF | 20% | 50V | |
| 2152© | 4822 126 12105 | 33nF | 5% | 63V | not for /14 |
| 2152© | 5322 116 80853 | 560pF | 5% | 63V | only for /14 |
| 2153© | 4822 122 32139 | 12pF | 5% | 63V | only for /14 |
| 2153© | 4822 122 32504 | 15pF | 5% | 50V | not for /14 |
| 2155 | 4822 125 60101 | 3-11pF | TRIMCAP. | | |
| 2159© | 5322 122 32659 | 33pF | 5% | 50V | |
| 2160© | 5322 122 32654 | 22nF | 10% | 63V | |
| 2164© | 4822 126 13482 | 470nF | 20% | 16V | |
| 2165© | 4822 126 10002 | 100nF | 20% | 50V | |
| 2166© | 5322 122 34123 | 1nF | 10% | 50V | |
| 2167© | 4822 122 32139 | 12pF | 5% | 63V | |
| 2168© | 4822 126 13695 | 82pF | 1% | 63V | |

### RESISTORS

| | | | | | |
|---|---|---|---|---|---|
| 3101© | 4822 051 20333 | 33kΩ | 5% | 0,1W | not for /14 |
| 3101© | 4822 051 20562 | 5,6kΩ | 5% | 0,1W | only for /14 |
| 3102© | 4822 051 20104 | 100kΩ | 5% | 0,1W | |
| 3103© | 4822 117 10965 | 18kΩ | 2% | 0,1W | |
| 3104© | 4822 117 11448 | 180Ω | 10% | 0,1W | |
| 3105 | 4822 116 83872 | 220Ω | 5% | 0,5W | |
| 3110 | 4822 116 52195 | 47Ω | 5% | 0,5W | |
| 3120© | 4822 051 20008 | CHIP JUMPER 0805 | | | |
| 3132 | 4822 116 52195 | 47Ω | 5% | 0,5W | |
| 3134© | 4822 051 20224 | 220kΩ | 5% | 0,1W | |
| 3141© | 4822 117 11148 | 56kΩ | 1% | 0,1W | |

### RESISTORS

| | | | | | |
|---|---|---|---|---|---|
| 3142 | 4822 100 11163 | 100kΩ TRIMPOT LIN. | | | |
| 3145© | 4822 117 11449 | 2,2kΩ | 1% | 0,1W | |
| 3146© | 4822 051 20229 | 22Ω | 5% | 0,1W | |
| 3152 | 4822 116 83883 | 470Ω | 5% | 0,16W | |
| 3153© | 4822 051 20471 | 470Ω | 5% | 0,1W | |
| 3154 | 4822 116 83868 | 150Ω | 5% | 0,5W | |
| 3155© | 4822 051 20471 | 470Ω | 5% | 0,1W | |
| 3156© | 4822 051 20104 | 100kΩ | 5% | 0,1W | not for /14/17 |
| 3157 | 4822 116 52234 | 100kΩ | 5% | 0,5W | only for /14 |
| 3158 | 4822 116 83883 | 470Ω | 5% | 0,16W | |
| 3159 | 4822 116 83883 | 470Ω | 5% | 0,16W | |
| 3160 | 4822 116 83883 | 470Ω | 5% | 0,16W | |
| 3161 | 4822 116 83883 | 470Ω | 5% | 0,16W | |
| 3167© | 4822 117 11503 | 220Ω | 5% | 0,1W | |
| 3169© | 4822 051 20154 | 150kΩ | 5% | 0,1W | |
| 3170 | 4822 116 52234 | 100kΩ | 5% | 0,5W | not for /14 |
| 3171 | 4822 116 52219 | 330Ω | 5% | 0,5W | |
| 4101© | 4822 051 20008 | CHIP JUMPER 0805 | | | |
| 4102© | 4822 051 20008 | CHIP JUMPER 0805 | | | |
| 4103© | 4822 051 20008 | CHIP JUMPER 0805 | | | |
| 4104© | 4822 051 20008 | CHIP JUMPER 0805 | | | |
| 4105© | 4822 051 20008 | CHIP JUMPER 0805 | | | |
| 4106© | 4822 051 20008 | CHIP JUMPER 0805 | | | |
| 4108© | 4822 051 20008 | CHIP JUMPER 0805 | | | |
| 4111© | 4822 051 20008 | CHIP JUMPER 0805 | | | |
| 4120© | 4822 051 20008 | CHIP JUMPER 0805 | | | |
| 4150© | 4822 051 10008 | CHIP JUMPER 1206 | | | |
| 4152© | 4822 051 10008 | CHIP JUMPER 1206 | | | |
| 4153© | 4822 051 10008 | CHIP JUMPER 1206 | | | |
| 4154© | 4822 051 10008 | CHIP JUMPER 1206 | | | |
| 4157© | 4822 051 10008 | CHIP JUMPER 1206 | | | |
| 4158© | 4822 051 10008 | CHIP JUMPER 1206 | | | |
| 4159© | 4822 051 10008 | CHIP JUMPER 1206 | | | |

### COILS

| | | |
|---|---|---|
| 5102 | 4822 157 71634 | RF-COIL MW |
| 5109 | 4822 242 70665 | FM-IF FILTER 10,7MHZ |
| 5110 | 4822 242 70665 | FM-IF FILTER 10,7MHZ |
| 5111 | 4822 158 60511 | AM-IF FILTER 450kHz |
| 5112 | 4822 157 70302 | AM-IF FILTER 450kHz |
| 5114 | 4822 157 70302 | AM-IF FILTER 450kHz |
| 5119 | 4822 157 11443 | DISCRIMINATOR COIL |
| 5121 | 4822 242 10261 | QUARTZ 75kHz |
| 5123 | 4822 157 60517 | RF-COIL AM |
| 5130 | 4822 156 30947 | RF COIL 1,5 TURNS |
| 5131 | 4822 156 30947 | RF COIL 1,5 TURNS |

### DIODES

| | | | |
|---|---|---|---|
| 6103 | 4822 130 30621 | 1N4148 | |
| 6104 | 4822 130 30621 | 1N4148 | |
| 6105© | 4822 130 83075 | HN1V02H | |
| 6106 | 4822 130 30621 | 1N4148 | |
| 6107 | 4822 130 34488 | BZX79-C11 | |
| 6120 | 4822 130 30621 | 1N4148 | only for /14/17 |
| 6130© | 4822 130 82833 | 1SV228 | |
| 6131© | 4822 130 82833 | 1SV228 | |

### TRANSISTORS

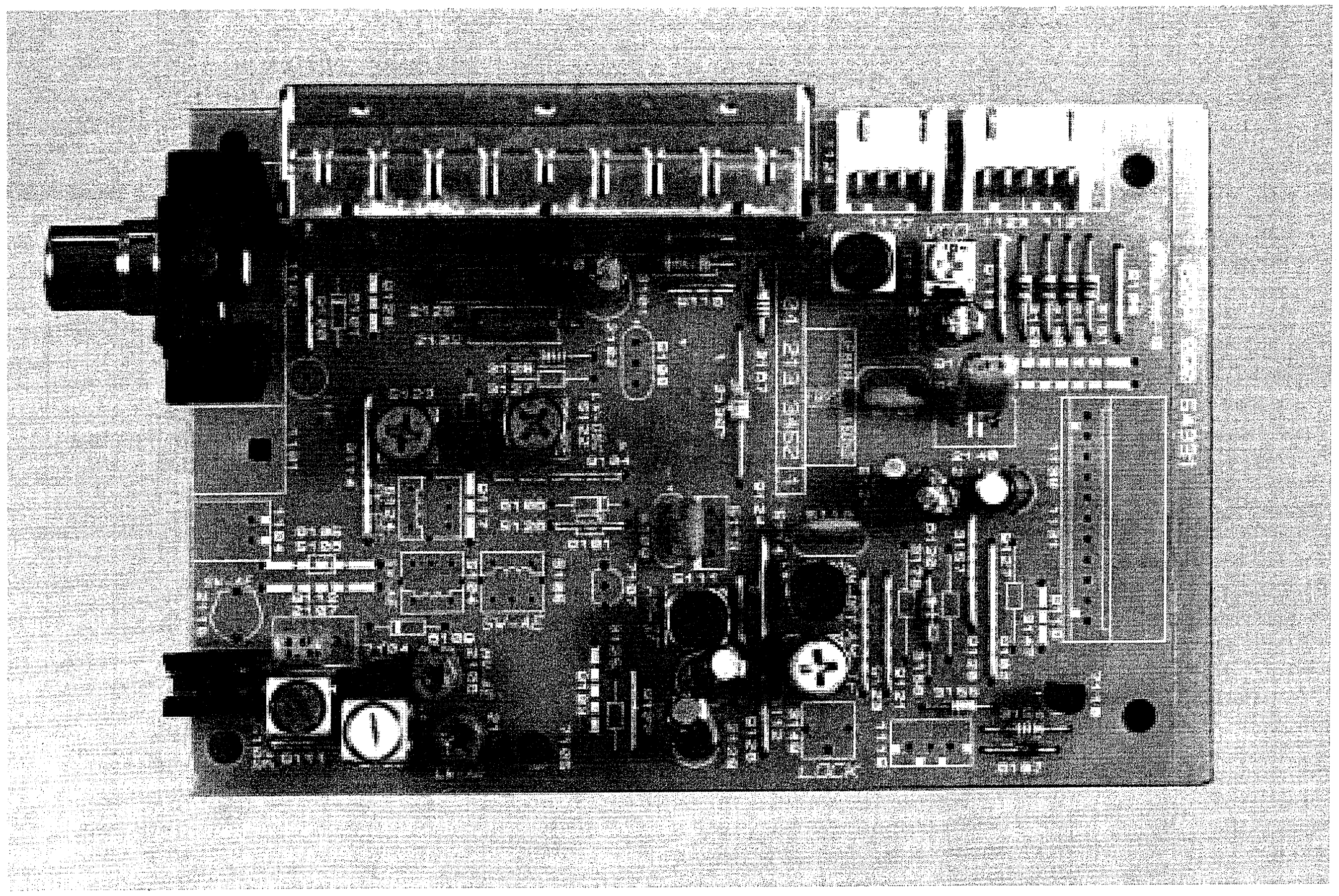
| | | |
|---|---|---|
| 7102 | 4822 130 60093 | 2SA838B |
| 7111© | 5322 130 42136 | BC848C |

### INTEGRATED CIRCUITS

| | | |
|---|---|---|
| 7101© | 4822 209 90924 | TEA5757H/V1, RADIO IC |

## ELECTRICAL PARTS LIST *TUNER ECO5 for /06 ( Japanese version)*

| | | |
|---|---|---|
| 1102 | 4822 265 20598 | SOCKET COAX YKD31-0468 75Ω |
| 1130 | 4822 267 10749 | CONNECTOR S11B-XH-A (11P) |
| 2111 | 5322 122 32531 | 100pF 5%NP0 50V |
| 2153 | 5322 122 33063 | 2.2pF 5% NP0 50V |
| 3113 | 4822 051 10102 | 1kΩ 2% 0,25W |
| 3119 | 4822 051 20331 | 330Ω 5% 0,1W |
| 3134 | 4822 051 20223 | 22kΩ 5% 0,1W |
| 3147 | 4822 111 50499 | 3.3MΩ 5% 0,2W |
| 3155 | 4822 051 20101 | 100Ω 5% 0,1W |
| 3175 | 4822 117 12955 | 2.7kΩ 1% 0,1W 0805 |
| 3177 | 4822 117 10833 | 10kΩ 1% 0,1W |
| 3178 | 4822 051 20335 | 3.3MΩ 5% 0,1W |
| 3179 | 4822 051 20105 | 1MΩ 5% 0,1W |
| 4161 | 4822 051 20008 | CHIP JUMPER. 0805 |
| 5113 | 4822 242 80989 | FILTER SER. SFU450B 457kHz |
| 5130 | 4822 157 70033 | COIL-FM OSC |
| 7101 | *HC104790R | TEA5759H/V1 RADIO IC |
| 7119 | 4822 130 60163 | 2SC1047C |
| 7125 | 5322 130 42755 | BC847C BC848C |



# TUNER 95 BOARD

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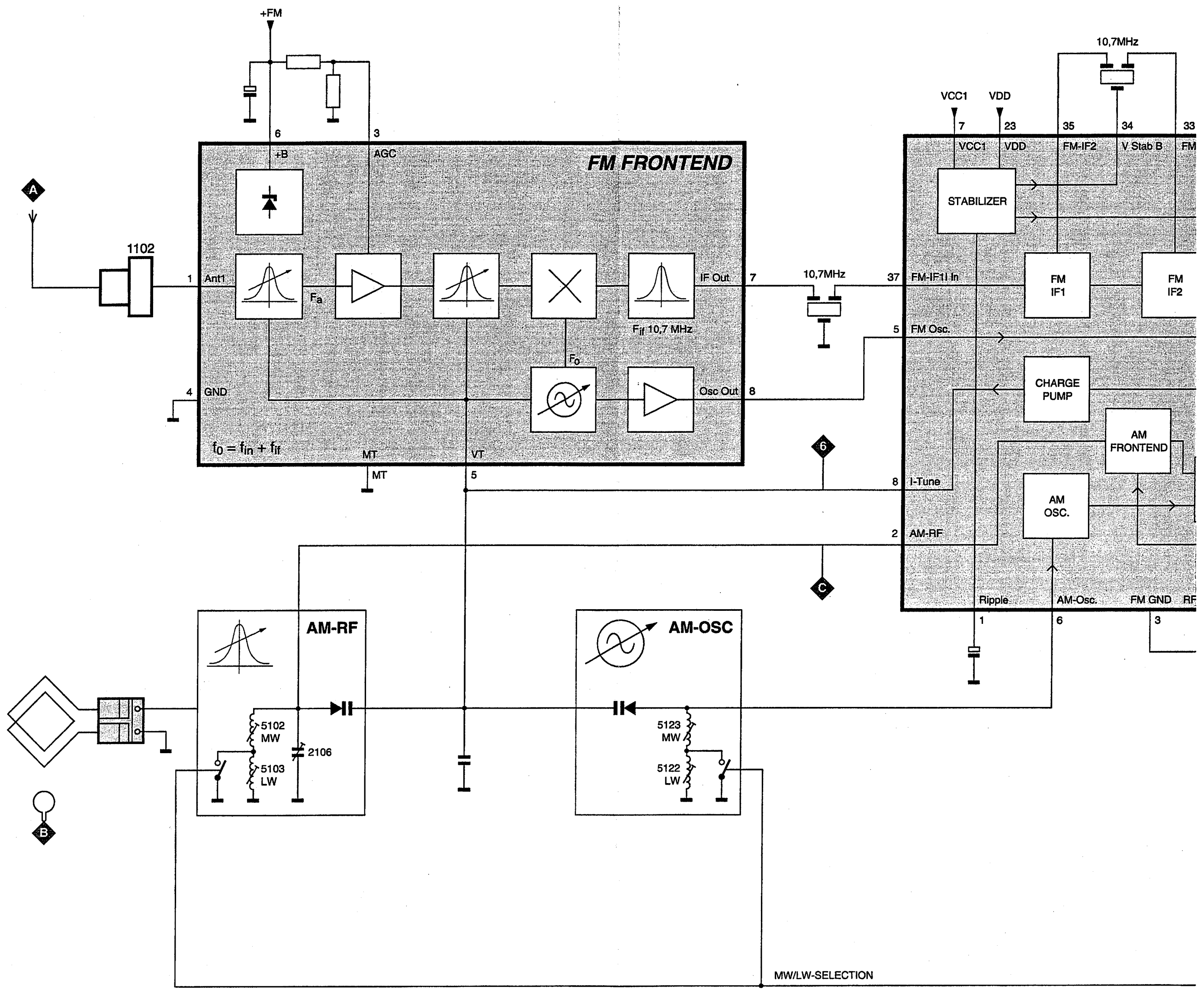
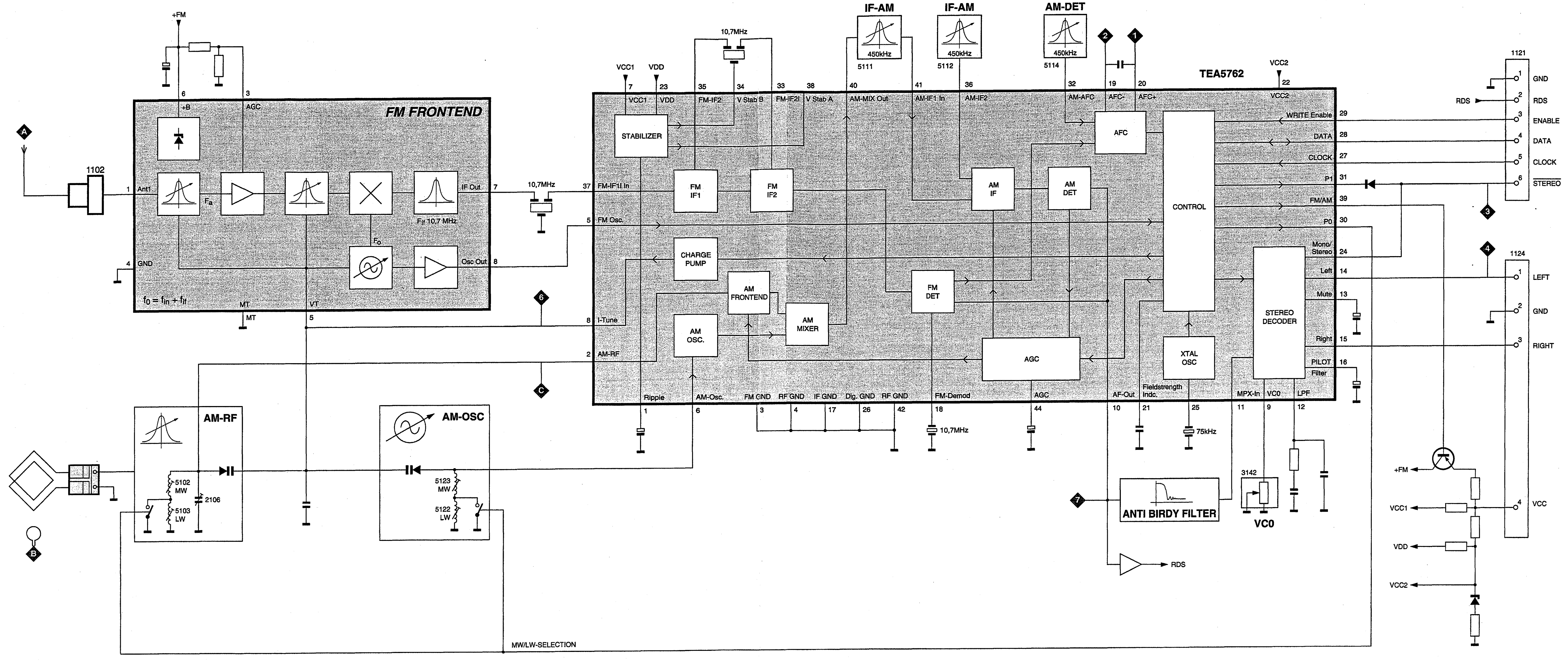
Component layout.............................................7D-2
Circuit diagram .................................................7D-3
Partslist ............................................................7D-4

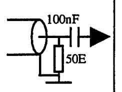
## BLOCKDIAGRAM


+FM
6
3
+B
AGC
FM FRONTEND
A
1102
1
Ant1
Fa
IF Out
7
Fif 10,7 MHz
Fo
4
GND
Osc Out
8
f0 = fin + fif
MT
VT
MT
5
10,7MHz
10,7MHz
VCC1
VDD
7
23
35
34
33
VCC1
VDD
FM-IF2
V Stab B
STABILIZER
37
FM-IF1 In
FM IF1
FM IF2
5
FM Osc.
CHARGE PUMP
AM FRONTEND
6
8
I-Tune
AM OSC.
2
AM-RF
C
Ripple
AM-Osc.
FM GND
1
6
3
AM-RF
5102 MW
5103 LW
2106
AM-OSC
5123 MW
5122 LW
B
MW/LW-SELECTION

## BLOCKDIAGRAM


+FM
6
3
+B
AGC
FM FRONTEND
A
1102
1 Ant1
$F_a$
IF Out
7
$F_{if}$ 10,7 MHz
$F_o$
Osc Out
8
4 GND
$f_0 = f_{in} + f_{if}$
MT
VT
MT
5
10,7MHz
6
C
B
AM-RF
5102 MW
5103 LW
2106
AM-OSC
5123 MW
5122 LW
MW/LW-SELECTION
10,7MHz
VCC1
VDD
IF-AM
450kHz
5111
IF-AM
450kHz
5112
AM-DET
450kHz
5114
2
1
TEA5762
VCC2
7
23
35
34
33
38
40
41
36
32
19
20
22
VCC1
VDD
FM-IF2
V Stab B
FM-IF2I
V Stab A
AM-MIX Out
AM-IF1 In
AM-IF2
AM-AFC
AFC-
AFC+
VCC2
STABILIZER
37 FM-IF1I In
5 FM Osc.
FM IF1
FM IF2
AM IF
AM DET
AFC
CONTROL
CHARGE PUMP
AM FRONTEND
AM MIXER
AM OSC.
FM DET
AGC
XTAL OSC
STEREO DECODER
8 I-Tune
2 AM-RF
WRITE Enable 29
DATA 28
CLOCK 27
P1 31
FM/AM 39
P0 30
Mono/ Stereo 24
Left 14
Mute 13
Right 15
PILOT Filter 16
Ripple
AM-Osc.
FM GND
RF GND
IF GND
Dig. GND
RF GND
FM-Demod
AGC
AF-Out
Fieldstrength Indc.
MPX-In
VC0
LPF
1
6
3
4
17
26
42
18
44
10
21
25
11
9
12
10,7MHz
75kHz
3142
VC0
ANTI BIRDY FILTER
7
RDS
1121
1 GND
2 RDS
3 ENABLE
4 DATA
5 CLOCK
6 STEREO
RDS
3
4
1124
1 LEFT
2 GND
3 RIGHT
4 VCC
+FM
VCC1
VDD
VCC2

## **TUNER 95 bis Adjustment Table** (FM, MW, LW with Frame antenna)

| Waverange | Input frequency | Input | Set tuned to | Adjust | Output | Scope / Voltmeter |
|---|---|---|---|---|---|---|
| *VARICAP ALIGNMENT* | | | | | | |
| **FM** (50) | | | 108 MHz | check | ◇6 | 7 ... 9V |
| 87.5 - 108 MHz | | | 87.5 MHz | check | | 1.3 ... 2V |
| **MW** (9) | | | 1602 kHz | 5123 | | 8.3V ± 0.2V |
| 531 - 1602 kHz | | | 531 kHz | check | | 1V ± 0.4V |
| **LW** (3) | | | 279 kHz | 5122 | | 8.3V ± 0.2V |
| 153 - 279 kHz | | | 153 kHz | check | | 1V ± 0.4V |
| *FM – DETECTION* | | | | | | |
| **FM** | 98 MHz 1mV<br>continuous wave<br>***short pin 21 (IC7101) to ground*** | ◇A | 98 MHz | 5107 | ◇1<br>◇2 | 0mV ± 3mV |
| *FM – VCO* | | | | | | |
| **FM** | 98 MHz 1 mV<br>continuous wave | ◇A | 98 MHz | 3142 | ◇3 | 152kHz ± 1 kHz |
| *DISTORTION* | | | | | | |
| **FM** | 98 MHz 1 mV<br>90 % L +<br>9 % pilot<br>mod = 1kHz | ◇A | 98MHz | mixcoil<br>inside<br>Tuner<br>1110 | ◇4 | Distortion<br>minimum |
| *AM – IF* | | | | | | |
| **MW** | 450kHz<br>Δf = 10kHz<br>Low as possible<br>Swept signal |  | MW | 5111 | ◇7 | symmetrical and<br>max. height ↕ |
| | | | | 5112 | | |
| | 450kHz<br>continuous wave | ◇C | | 5114 | ◇1<br>◇2 | 0mV ± 2mV |
| *AM - RF* | | | | | | |
| **MW** | 558kHz<br>Mod = 1kHz<br>30 % AM<br>1494 kHz | ◇B | 558kHz | 5102 | ◇ | MAX ↕ |
| | | | 1494kHz 7 | 2106 | | |
| **LW** | 198kHz<br>mod = 1kHz<br>30 % AM | * | 198kHz | 5103 | | MAX |

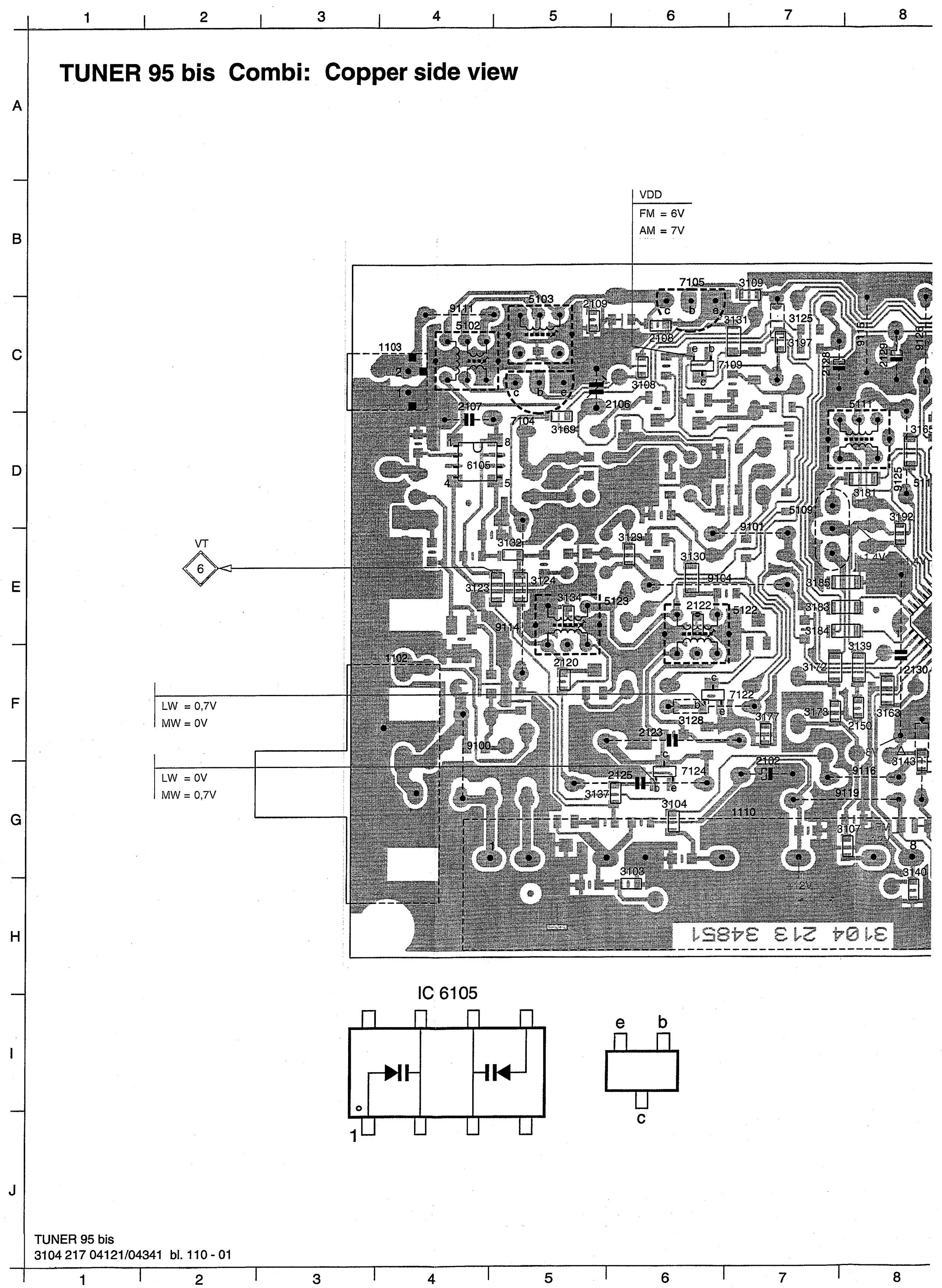
adjtable for 3104 217 04121/04341

* Signal send via a frame antenna
(..) = tuning grid in kHz

↕ repeat

| | |
|---|---|
| 1102 | F4 |
| 1103 | C3 |
| 1110 | G7 |
| 1121 | H11 |
| 1124 | H9 |
| 1126 | G10 |
| 2102 | G7 |
| 2106 | C5 |
| 2107 | C4 |
| 2108 | C6 |
| 2109 | C5 |
| 2120 | F5 |
| 2122 | E6 |
| 2123 | F6 |
| 2125 | G5 |
| 2127 | F9 |
| 2128 | C7 |
| 2129 | C8 |
| 2130 | F8 |
| 2131 | F9 |
| 2132 | F9 |
| 2133 | F10 |
| 2134 | G10 |
| 2135 | G11 |
| 2136 | G10 |
| 2137 | E11 |
| 2138 | E10 |
| 2140 | F10 |
| 2141 | E10 |
| 2142 | E9 |
| 2143 | C10 |
| 2144 | E10 |
| 2145 | G11 |
| 2147 | G11 |
| 2148 | E9 |
| 2150 | F8 |
| 2151 | F9 |
| 2152 | F9 |
| 2158 | D10 |
| 2160 | E9 |
| 2161 | E9 |
| 2162 | C11 |
| 3103 | H6 |
| 3104 | G6 |
| 3107 | G7 |
| 3108 | C6 |
| 3109 | B7 |
| 3123 | E4 |
| 3124 | E5 |
| 3125 | C7 |
| 3128 | F6 |
| 3129 | E6 |
| 3130 | E6 |
| 3131 | C6 |
| 3132 | E5 |
| 3134 | E5 |
| 3137 | G5 |
| 3138 | D9 |
| 3139 | F8 |
| 3140 | H8 |
| 3141 | G9 |
| 3142 | G10 |
| 3143 | G8 |
| 3144 | H8 |
| 3145 | F9 |
| 3146 | B10 |
| 3150 | C11 |
| 3151 | C10 |
| 3152 | G9 |
| 3153 | G9 |
| 3154 | C10 |
| 3155 | C10 |
| 3158 | G11 |
| 3159 | G11 |
| 3160 | G11 |
| 3161 | G11 |
| 3162 | D9 |
| 3163 | F8 |
| 3164 | C11 |
| 3165 | D8 |
| 3167 | F8 |
| 3169 | D5 |
| 3171 | D11 |
| 3172 | F7 |
| 3173 | F7 |
| 3176 | D9 |
| 3177 | F7 |
| 3181 | D8 |

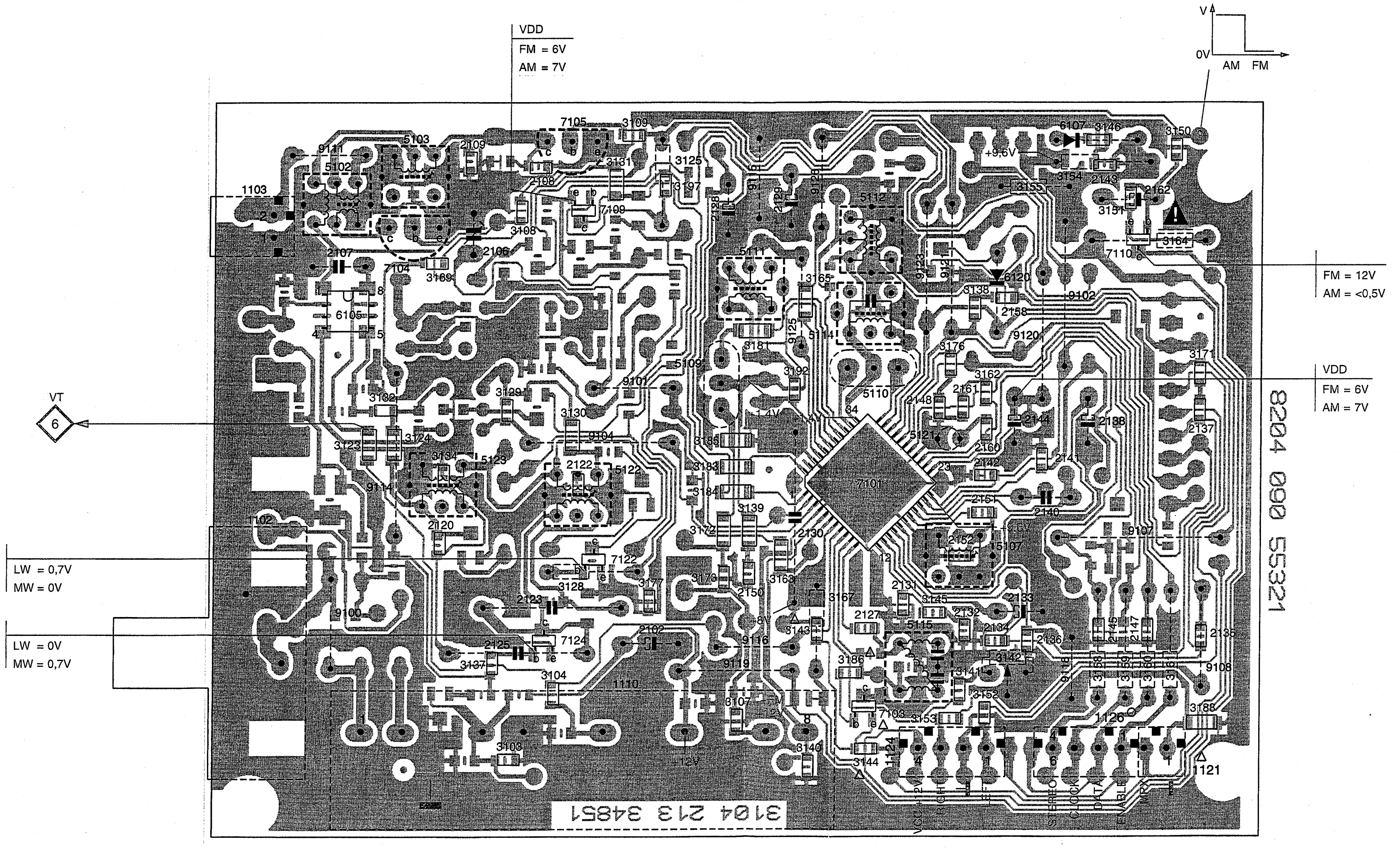
## TUNER 95 bis Combi: Copper side view


1
2
3
4
5
6
7
8
A
B
C
D
E
F
G
H
I
J
VDD
FM = 6V
AM = 7V
VT
6
LW = 0,7V
MW = 0V
LW = 0V
MW = 0,7V
1103
1102
1110
5103
5102
2109
7105
3109
3131
3125
2106
2107
7104
3169
6105
3123
3124
3134
5123
2122
5122
2120
3128
7122
2123
2125
7124
3137
3104
2102
3108
3129
3130
3162
3138
9101
3163
3177
3172
3139
3140
3107
3104 213 34851
IC 6105
1
e
b
c

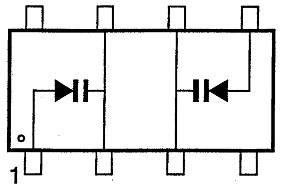
TUNER 95 bis
3104 217 04121/04341 bl. 110 - 01

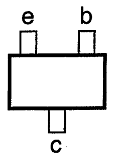
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1102 | F4 | 2107 | C4 | 2128 | C7 | 2136 | G10 | 2145 | G11 | 2161 | E9 | 3124 | E5 | 3137 | G5 | 3145 | F9 | 3158 | G11 | 3167 | F8 | 3183 | E7 | 5103 | C5 | 5121 | E9 | 7104 | D5 | 9102 | D10 | 9118 | G10 |
| 1103 | C3 | 2108 | C6 | 2129 | C8 | 2137 | E11 | 2147 | G11 | 2162 | C11 | 3125 | C7 | 3138 | D9 | 3146 | B10 | 3159 | G11 | 3169 | D5 | 3184 | E7 | 5107 | F10 | 5122 | E7 | 7105 | B6 | 9104 | E6 | 9119 | G7 |
| 1110 | G7 | 2109 | C5 | 2130 | F8 | 2138 | E10 | 2148 | E9 | 3103 | H6 | 3128 | F6 | 3139 | F8 | 3150 | C11 | 3160 | G11 | 3171 | D11 | 3185 | E7 | 5109 | D7 | 5123 | E5 | 7109 | C6 | 9107 | F11 | 9120 | D10 |
| 1121 | H11 | 2120 | F5 | 2131 | F9 | 2140 | F10 | 2150 | F8 | 3104 | G6 | 3129 | E6 | 3140 | H8 | 3151 | C10 | 3161 | G11 | 3172 | F7 | 3186 | G8 | 5110 | E9 | 6105 | D4 | 7110 | D11 | 9108 | G11 | 9121 | D9 |
| 1124 | H9 | 2122 | E6 | 2132 | F9 | 2141 | E10 | 2151 | F9 | 3107 | G7 | 3130 | E6 | 3141 | G9 | 3152 | G9 | 3162 | D9 | 3173 | F7 | 3188 | G11 | 5111 | C8 | 6107 | B10 | 7122 | F7 | 9111 | C4 | 9123 | D9 |
| 1126 | G10 | 2123 | F6 | 2133 | F10 | 2142 | E9 | 2152 | F9 | 3108 | C6 | 3131 | C6 | 3142 | G10 | 3153 | G9 | 3163 | F8 | 3176 | D9 | 3192 | D8 | 5112 | C9 | 6120 | D10 | 7124 | G6 | 9114 | E5 | 9125 | D8 |
| 2102 | G7 | 2125 | G5 | 2134 | G10 | 2143 | C10 | 2158 | D10 | 3109 | B7 | 3132 | E5 | 3143 | G8 | 3154 | C10 | 3164 | C11 | 3177 | F7 | 3197 | C7 | 5114 | D8 | 7101 | E9 | 9100 | F4 | 9115 | C8 | 9126 | C8 |
| 2106 | C5 | 2127 | F9 | 2135 | G11 | 2144 | E10 | 2160 | E9 | 3123 | E4 | 3134 | E5 | 3144 | H8 | 3155 | C10 | 3165 | D8 | 3181 | D8 | 5102 | C4 | 5115 | G9 | 7103 | G9 | 9101 | E7 | 9116 | G8 | | |

# TUNER 95 bis Combi: Copper side view


1 2 3 4 5 6 7 8 9 10 11 12 13
A B C D E F G H I J
VDD
FM = 6V
AM = 7V
V
0V
AM FM
FM = 12V
AM = <0,5V
VDD
FM = 6V
AM = 7V
VT
6
LW = 0,7V
MW = 0V
LW = 0V
MW = 0,7V
8204 090 55321
3104 213 34851
7101
6105
1103
1110
1121
1126
+9,5V
12V

IC 6105

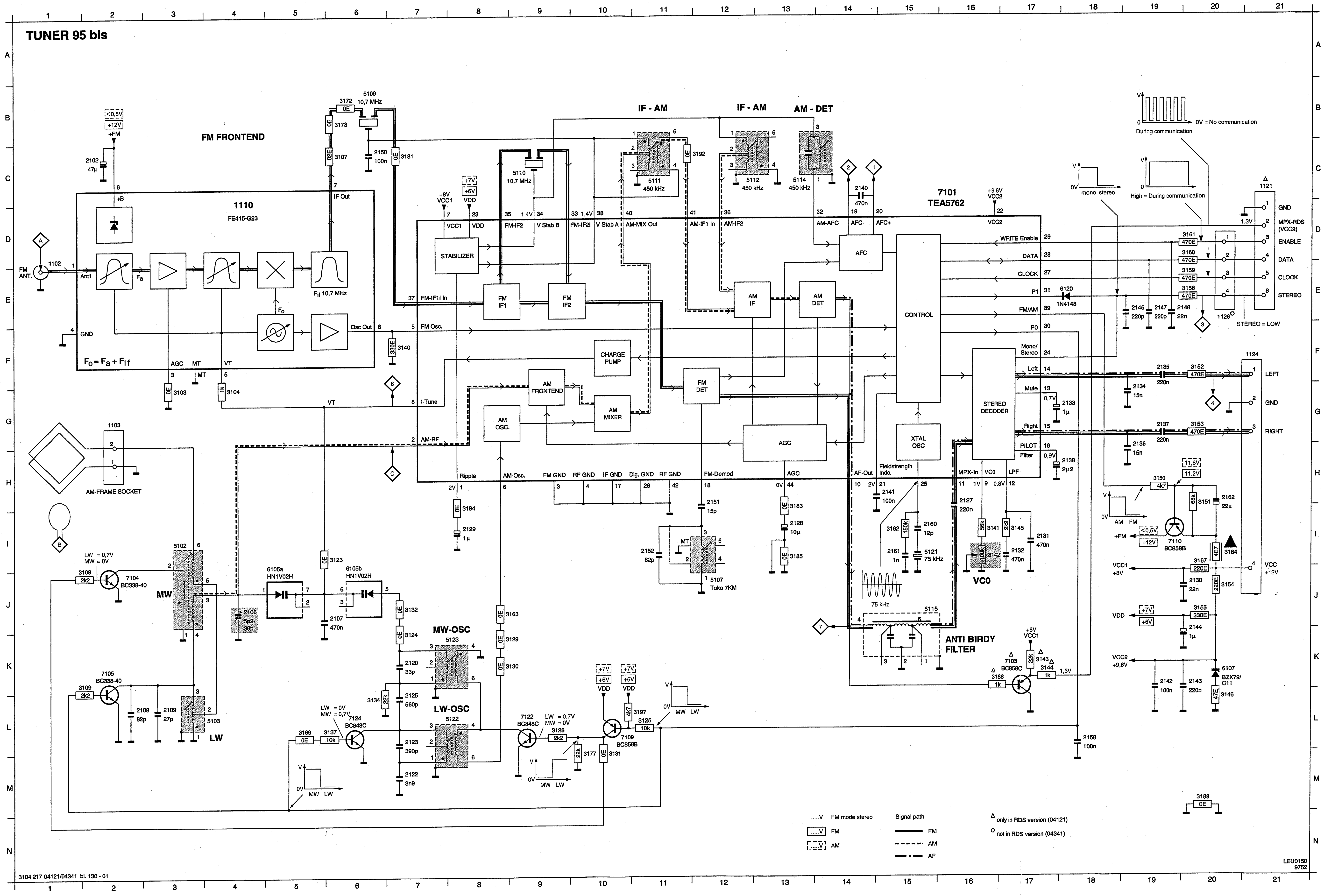




△ only in RDS version (04121)

○ not in RDS version (04341)

| | |
|---|---|
| 1102 | D1 |
| 1103 | G2 |
| 1110 | D4 |
| 1121 | C21 |
| 1124 | F21 |
| 1126 | E20 |
| 2102 | C2 |
| 2106 | J4 |
| 2107 | J6 |
| 2108 | L2 |
| 2109 | L3 |
| 2120 | K7 |
| 2122 | M7 |
| 2123 | L7 |
| 2125 | L7 |
| 2127 | H16 |
| 2128 | I13 |
| 2129 | I8 |
| 2130 | J20 |
| 2131 | I17 |
| 2132 | I17 |
| 2133 | G18 |
| 2134 | G19 |
| 2135 | F19 |
| 2136 | H19 |
| 2137 | G19 |
| 2138 | H18 |
| 2140 | C14 |
| 2141 | H15 |
| 2142 | K19 |
| 2143 | K20 |
| 2144 | K20 |
| 2145 | E19 |
| 2147 | E19 |
| 2148 | E19 |
| 2150 | C6 |
| 2151 | H12 |
| 2152 | I11 |
| 2158 | L18 |
| 2160 | I15 |
| 2161 | I15 |
| 2162 | H20 |
| 3103 | G3 |
| 3104 | G4 |
| 3107 | C6 |
| 3108 | J1 |
| 3109 | K1 |
| 3123 | I6 |
| 3124 | K7 |
| 3125 | L11 |
| 3128 | L9 |
| 3129 | K8 |
| 3130 | K8 |
| 3131 | M10 |
| 3132 | J7 |
| 3134 | L6 |
| 3137 | L5 |
| 3140 | F7 |
| 3141 | I16 |
| 3142 | I16 |
| 3143 | K17 |
| 3144 | K17 |
| 3145 | I17 |
| 3146 | L20 |
| 3150 | H19 |
| 3151 | I20 |
| 3152 | F20 |
| 3153 | G20 |
| 3154 | J20 |
| 3155 | J20 |
| 3158 | E19 |
| 3159 | E19 |
| 3160 | D19 |
| 3161 | D19 |
| 3162 | I15 |
| 3163 | J8 |
| 3164 | I20 |
| 3167 | I20 |
| 3169 | L5 |
| 3172 | B6 |
| 3173 | B6 |
| 3177 | M10 |
| 3181 | C7 |
| 3183 | I13 |
| 3184 | I8 |
| 3185 | I13 |
| 3186 | K16 |
| 3188 | M20 |
| 3192 | C12 |
| 3197 | L11 |
| 5102 | I3 |
| 5103 | L4 |
| 5107 | J12 |
| 5109 | B6 |
| 5110 | C9 |
| 5111 | C11 |
| 5112 | C12 |
| 5114 | C13 |
| 5115 | J15 |
| 5121 | I15 |
| 5122 | L7 |
| 5123 | K7 |
| 6105a | I5 |
| 6105b | I6 |
| 6107 | K20 |
| 6120 | E17 |
| 7101 | C15 |
| 7103 | K17 |
| 7104 | J2 |
| 7105 | K2 |
| 7109 | L10 |
| 7110 | I19 |
| 7122 | L9 |
| 7124 | L6 |


TUNER 95 bis
FM FRONTEND
1110
FE415-G23
FM ANT.
Ant1
GND
IF Out
Osc Out
AGC
MT
VT
F_a
F_o
F_if 10,7 MHz
F_o = F_a + F_if
IF - AM
IF - AM
AM - DET
5109 10,7 MHz
5110 10,7 MHz
5111 450 kHz
5112 450 kHz
5114 450 kHz
7101
TEA5762
STABILIZER
FM IF1
FM IF2
CHARGE PUMP
AM FRONTEND
AM MIXER
AM OSC.
FM DET
AM IF
AM DET
AFC
CONTROL
AGC
XTAL OSC
STEREO DECODER
VCC1
VDD
FM-IF2
V Stab B
FM-IF2I
V Stab A
AM-MIX Out
AM-IF1 In
AM-IF2
AM-AFC
AFC-
AFC+
VCC2
FM-IF1I In
FM Osc.
I-Tune
AM-RF
Ripple
AM-Osc.
FM GND
RF GND
IF GND
Dig. GND
RF GND
FM-Demod
AF-Out
Fieldstrength Indc.
MPX-In
VCO
LPF
WRITE Enable
DATA
CLOCK
P1
FM/AM
P0
Mono/ Stereo
Left
Mute
Right
PILOT
Filter
1121
GND
MPX-RDS (VCC2)
ENABLE
DATA
CLOCK
STEREO
STEREO = LOW
1124
LEFT
GND
RIGHT
VCC +12V
0V = No communication
During communication
High = During communication
mono stereo
1103
AM-FRAME SOCKET
MW
LW
MW-OSC
LW-OSC
5102
5103
5122
5123
7104 BC338-40
7105 BC338-40
7124 BC848C
7122 BC848C
7109 BC858B
7110 BC858B
7103 BC858C
6105a HN1V02H
6105b HN1V02H
6120 1N4148
6107 BZX79/C11
5107 Toko 7KM
5121 75 kHz
5115
ANTI BIRDY FILTER
75 kHz
VC0
LW = 0,7V MW = 0V
LW = 0V MW = 0,7V
MW LW
AM FM
+FM
VCC1 +8V
VDD
VCC2 +9,6V
Δ only in RDS version (04121)
○ not in RDS version (04341)
.....V FM mode stereo
FM
AM
Signal path
FM
AM
AF
3104 217 04121/04341 bl. 130 - 01
LEU0150 9752

## ELECTRICAL PARTS LIST - TUNER 95 BOARD

### MISCELLANEOUS

| | | |
|---|---|---|
| 1102 | 4822 267 10283 | Socket Coaxial IEC 75R |
| 1103 | 4822 265 31184 | JST Connector 2 pin |
| 1110 | 4822 210 10739 | Frontend Assembly FE415-G23 |

### CAPACITORS

| | | |
|---|---|---|
| 2102 | 4822 124 40433 | 47µF 20% 25V |
| 2106 | 4822 125 60102 | Trimmer 5,2-30pF 100V |
| 2107 | 4822 121 51252 | 470nF 5% 63V |
| 2108 | 4822 126 13695 | 82pF 1% 63V |
| 2109 | 4822 126 13691 | 27pF 1% 63V |
| 2120 | 5322 122 32659 | 33pF 5% 50V |
| 2122 | 5322 126 10465 | 3,9nF 10% 63V |
| 2125 | 4822 121 10578 | 560P 1% 630V |
| 2127 | 4822 122 32927 | 220nF +80/-20% 50V |
| 2128 | 4822 124 41579 | 10µF 20% 50V |
| 2129 | 4822 124 40242 | 1µF 20% 63V |
| 2130 | 4822 126 11585 | 22nF +80/-20% 25V |
| 2131 | 4822 122 33325 | 470nF 16V |
| 2132 | 4822 122 33325 | 470nF 16V |
| 2133 | 4822 124 40242 | 1µF 20% 63V |
| 2134 | 4822 126 13188 | 15nF 5% 63V |
| 2135 | 4822 122 32927 | 220nF +80/-20% 50V |
| 2136 | 4822 126 13188 | 15nF 5% 63V |
| 2137 | 4822 122 32927 | 220nF +80/-20% 50V |
| 2138 | 4822 124 41576 | 2,2µF 20% 50V |
| 2140 | 4822 121 51252 | 470nF 5% 63V |
| 2141 | 4822 122 31947 | 100nF 20% 63V |
| 2142 | 4822 122 31947 | 100nF 20% 63V |
| 2143 | 4822 122 32927 | 220nF +80/-20% 50V |
| 2144 | 4822 124 40242 | 1µF 20% 63V |
| 2145 | 4822 122 33575 | 220pF 5% 50V |
| 2147 | 4822 122 33575 | 220pF 5% 50V |
| 2148 | 4822 122 33809 | 22nF 20% 50V |
| 2150 | 4822 122 31947 | 100nF 20% 63V |
| 2151 | 4822 126 14236 | 50V 15pF 5% |
| 2152 | 4822 126 13695 | 82pF 1% 63V |
| 2158 | 4822 122 31947 | 100nF 20% 63V |
| 2160 | 4822 122 32139 | 12pF 2% 63V |
| 2161 | 5322 122 34123 | 1nF 10% 50V |
| 2162 | 4822 124 81151 | 22µF 50V |

### RESISTORS

| | | |
|---|---|---|
| 3103 | 4822 051 20008 | 0R Jumper 0805 |
| 3104 | 4822 051 10102 | 1k 2% 0,25W |
| 3107 | 4822 051 20829 | 82R 5% 0,1W |
| 3108 | 4822 117 11449 | 2k2 1% 0,1W |
| 3109 | 4822 117 11449 | 2k2 1% 0,1W |
| 3123 | 4822 051 10008 | 0R 5% 0,25W |
| 3124 | 4822 051 10008 | 0R 5% 0,25W |
| 3125 | 4822 116 83864 | 10k 5% 0,5W |
| 3128 | 4822 116 52256 | 2k2 5% 0,5W |
| 3129 | 4822 051 20008 | 0R Jumper 0805 |
| 3130 | 4822 051 10008 | 0R 5% 0,25W |
| 3131 | 4822 051 10008 | 0R 5% 0,25W |
| 3132 | 4822 051 20008 | 0R Jumper 0805 |
| 3134 | 4822 051 20223 | 22k 5% 0,1W |
| 3137 | 4822 117 10833 | 10k 1% 0,1W |
| 3138 | 4822 051 20008 | 0R Jumper 0805 |
| 3139 | 4822 051 10008 | 0R 5% 0,25W |
| 3140 | 4822 051 20331 | 330R 5% 0,1W |
| 3141 | 4822 051 20563 | 56k 5% 0,1W |
| 3142 | 4822 100 11163 | Trimmer 100k 30% 0,1W |
| 3143 | 4822 051 20223 | 22k 5% 0,1W |
| 3144 | 4822 051 10102 | 1k 2% 0,25W |
| 3145 | 4822 117 11449 | 2k2 1% 0,1W |
| 3146 | 4822 051 20479 | 47R 5% 0,1W |
| 3150 | 4822 051 20472 | 4k7 5% 0,1W |
| 3151 | 4822 051 20683 | 68k 5% 0,1W |
| 3152 | 4822 051 20471 | 470R 5% 0,1W |
| 3153 | 4822 051 20471 | 470R 5% 0,1W |
| 3154 | 4822 116 83872 | 220R 5% 0,5W |
| 3155 | 4822 116 52219 | 330R 5% 0,5W |
| 3158 | 4822 116 83883 | 470R 5% 0,5W |
| 3159 | 4822 116 83883 | 470R 5% 0,5W |
| 3160 | 4822 116 83883 | 470R 5% 0,5W |
| 3161 | 4822 116 83883 | 470R 5% 0,5W |
| 3162 | 4822 051 20224 | 220k 5% 0,1W |
| 3163 | 4822 051 10008 | 0R 5% 0,25W |
| 3164 | 4822 052 10478 ⚠ | 4R7 5% 0,33W |
| 3165 | 4822 051 10008 | 0R 5% 0,25W |
| 3167 | 4822 116 83872 | 220R 5% 0,5W |
| 3169 | 4822 051 20008 | 0R Jumper 0805 |
| 3171 | 4822 051 20008 | 0R Jumper 0805 |
| 3172 | 4822 051 10008 | 0R 5% 0,25W |
| 3173 | 4822 051 20008 | 0R Jumper 0805 |
| 3176 | 4822 051 20008 | 0R Jumper 0805 |
| 3177 | 4822 051 20223 | 22k 5% 0,1W |
| 3181 | 4822 051 10008 | 0R 5% 0,25W |
| 3183 | 4822 051 10008 | 0R 5% 0,25W |
| 3184 | 4822 051 10008 | 0R 5% 0,25W |
| 3185 | 4822 051 10008 | 0R 5% 0,25W |
| 3186 | 4822 051 10102 | 1k 2% 0,25W |
| 3188 | 4822 051 10008 | 0R 5% 0,25W |
| 3192 | 4822 051 20008 | 0R Jumper 0805 |
| 3197 | 4822 051 20472 | 4k7 5% 0,1W |

### COILS & FILTERS

| | | |
|---|---|---|
| 5102 | 4822 157 71634 | MW AERIAL |
| 5103 | 4822 157 71635 | LW AERIAL |
| 5107 | 4822 157 11443 | FM Discriminator 10,7MHz |
| 5109 | 4822 157 71639 | Ceram Filter 10,7MHz |
| 5110 | 4822 242 70665 | Ceram Filter 10,7MHz |
| 5111 | 4822 158 60511 | AM-IF Filter 450kHz |
| 5112 | 4822 157 70302 | AM-IF Filter 450kHz |

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## ELECTRICAL PARTS LIST - TUNER 95 BOARD

| | | |
|---|---|---|
| 5114 | 4822 157 70302 | AM-IF Filter 450kHz |
| 5115 | 4822 157 71636 | Anti-Birdy Filter |
| 5121 | 4822 242 10261 | X'tal Resonator 75kHz |
| 5122 | 4822 157 60517 | RF Coil AM |
| 5123 | 4822 157 60517 | RF Coil AM |

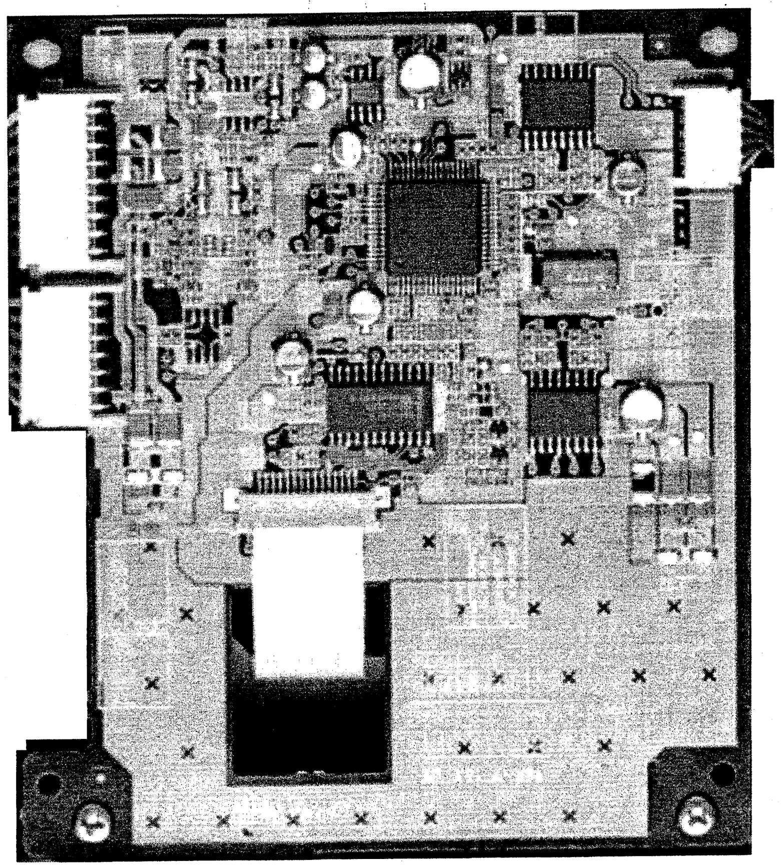
### DIODES

| | | |
|---|---|---|
| 6105 | 4822 130 83075 | HN1V02H-B |
| 6107 | 4822 130 34488 | BZX79-B11 |
| 6120 | 4822 130 30621 | 1N4148 |

### TRANSISTORS & INTEGRATED CIRCUITS

| | | |
|---|---|---|
| 7101 | 4822 209 90315 | TEA5762H/V1 |
| 7103 | 4822 130 42513 | BC858C |
| 7104 | 5322 130 44779 | BC338-40 |
| 7105 | 5322 130 44779 | BC338-40 |
| 7109 | 5322 130 41983 | BC858B |
| 7110 | 5322 130 41983 | BC858B |
| 7122 | 5322 130 42136 | BC848C |
| 7124 | 5322 130 42136 | BC848C |

Note: Only the parts mentioned in this list are normal service spare parts.



# CD BOARD NAMI 8

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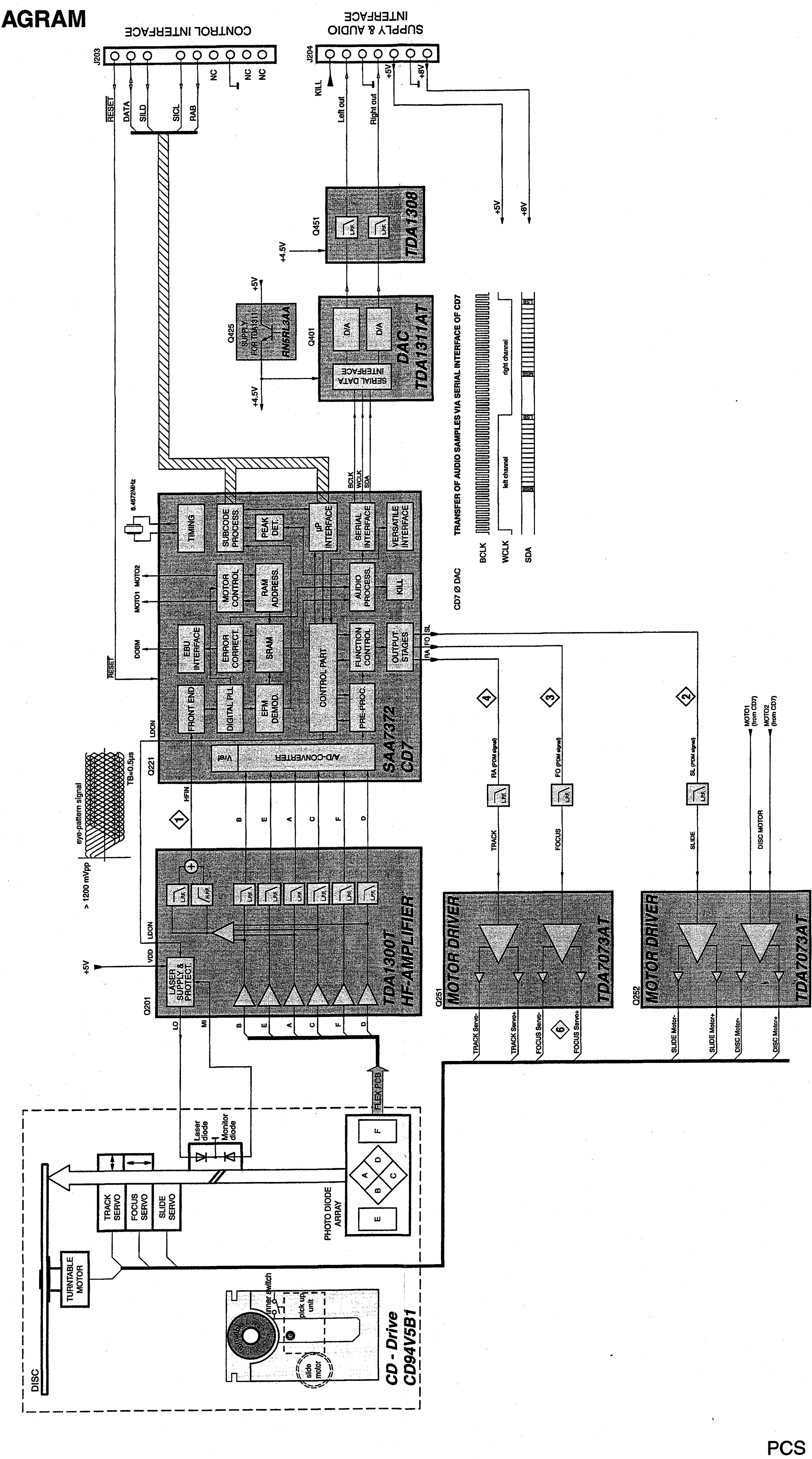
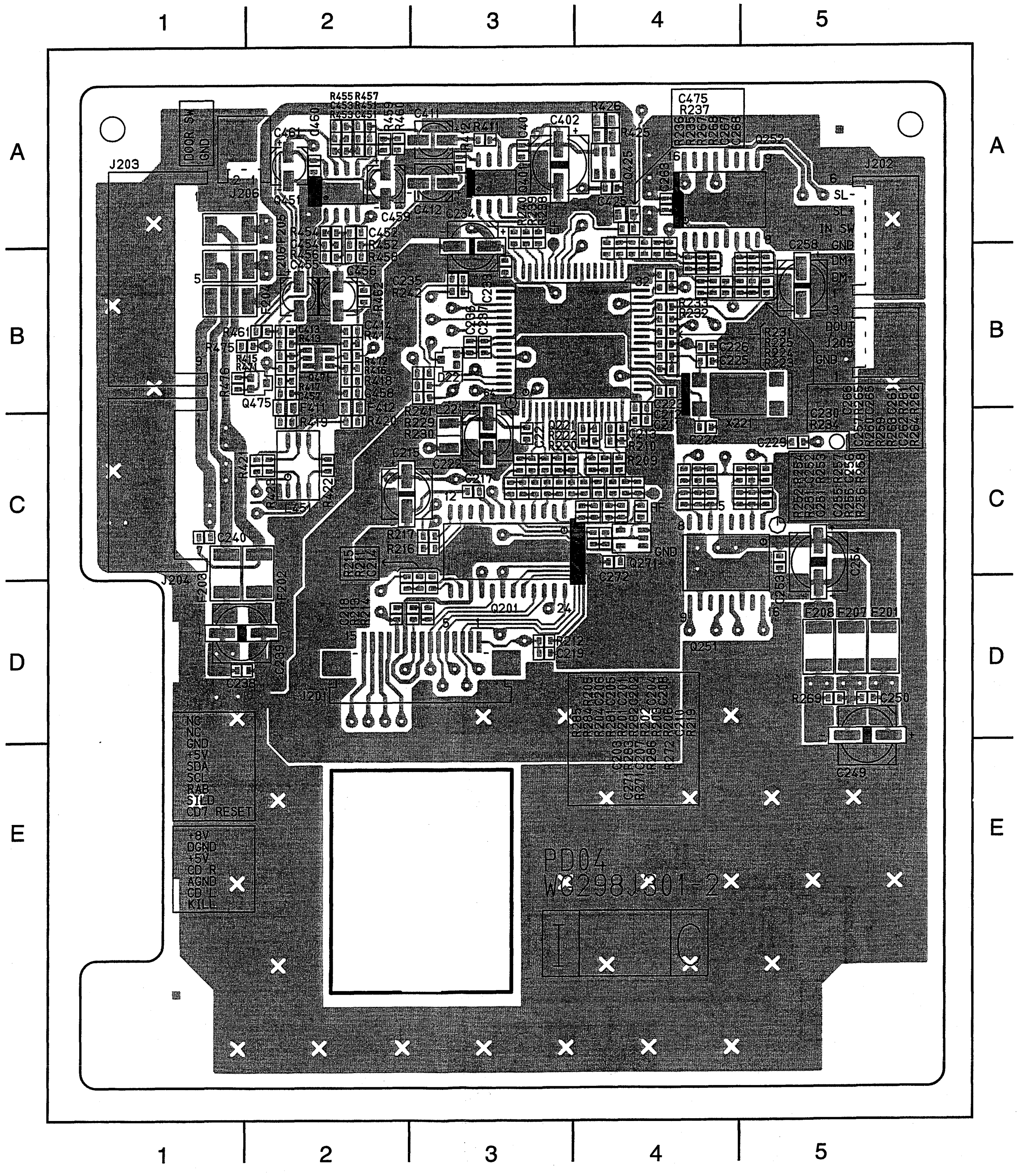
Circuit diagram .......... 8-3
Parts list .......... 8-4

## BLOCK DIAGRAM

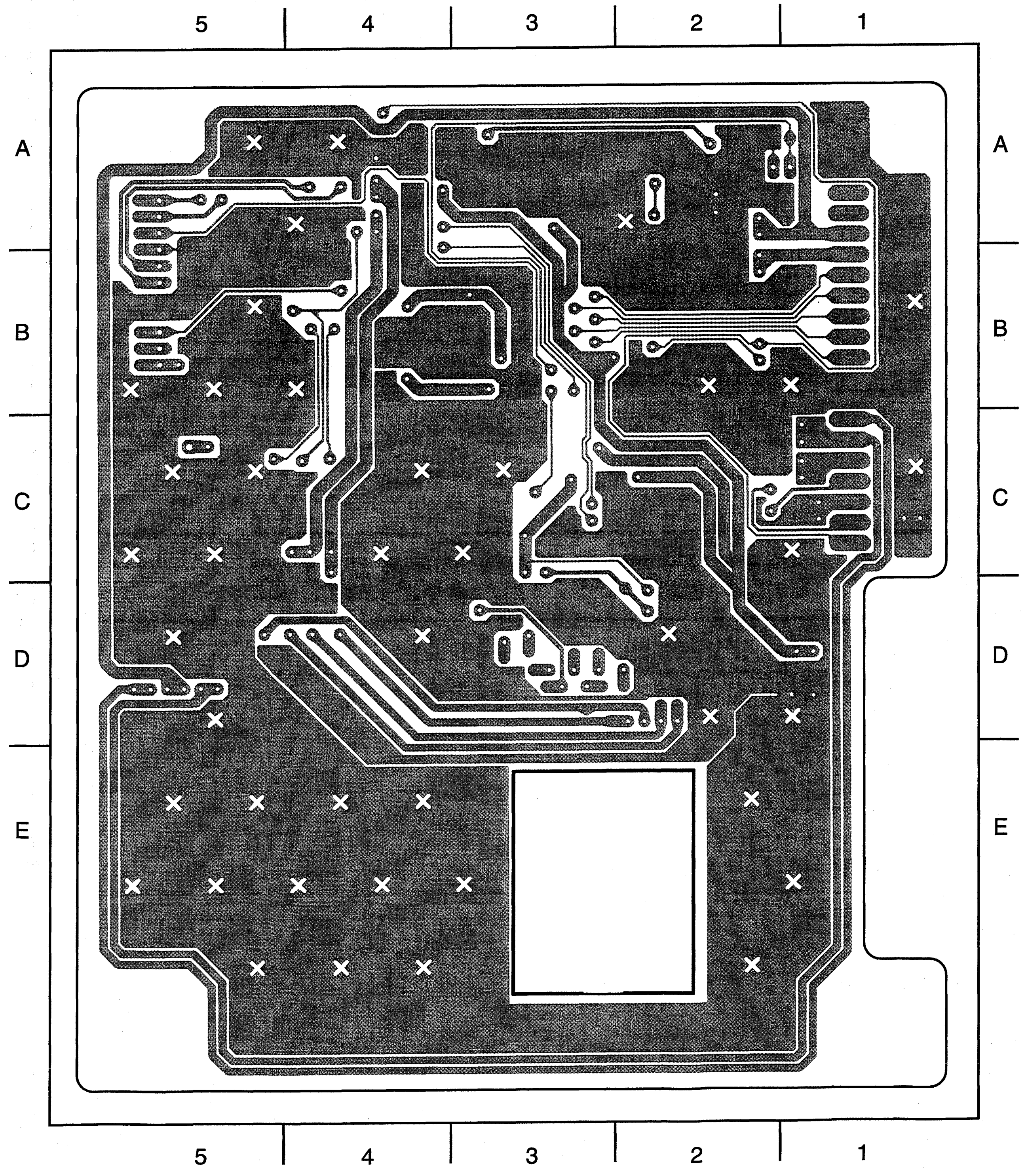

CONTROL INTERFACE
SUPPLY & AUDIO INTERFACE
J203
J204
RESET
DATA
SILD
SICL
RAB
NC
KILL
Left out
Right out
+5V
+8V
TDA1308
Q451
DAC TDA1311AT
Q401
SERIAL DATA INTERFACE
D/A
Q425
TRANSFER OF AUDIO SAMPLES VIA SERIAL INTERFACE OF CD7
BCLK
WCLK
SDA
CD7 Ø DAC
SAA7372 CD7
TIMING
SUBCODE PROCESS.
PEAK DET.
µP INTERFACE
SERIAL INTERFACE
VERSATILE INTERFACE
MOTOR CONTROL
RAM ADDRESS
AUDIO PROCESS.
KILL
EBU INTERFACE
ERROR CORRECT.
SRAM
CONTROL PART
FUNCTION CONTROL
OUTPUT STAGES
FRONT END
DIGITAL PLL
EFM DEMOD.
PRE-PROC.
A/D-CONVERTER
Vref
8.4672MHz
MOTO1
MOTO2
Q221
eye-pattern signal
> 1200 mVpp
TDA1300T HF-AMPLIFIER
LASER SUPPLY & PROTECT.
Q201
LO
MI
LDON
VDD
HFIN
+4.5V
B
E
A
C
F
D
MOTOR DRIVER TDA7073AT
Q251
Q252
TRACK
FOCUS
SLIDE
DISC MOTOR
TRACK Servo-
TRACK Servo+
FOCUS Servo-
FOCUS Servo+
SLIDE Motor-
SLIDE Motor+
DISC Motor-
DISC Motor+
FLEX PCB
Laser diode
Monitor diode
PHOTO DIODE ARRAY
TRACK SERVO
FOCUS SERVO
SLIDE SERVO
TURNTABLE MOTOR
DISC
CD - Drive CD94V5B1

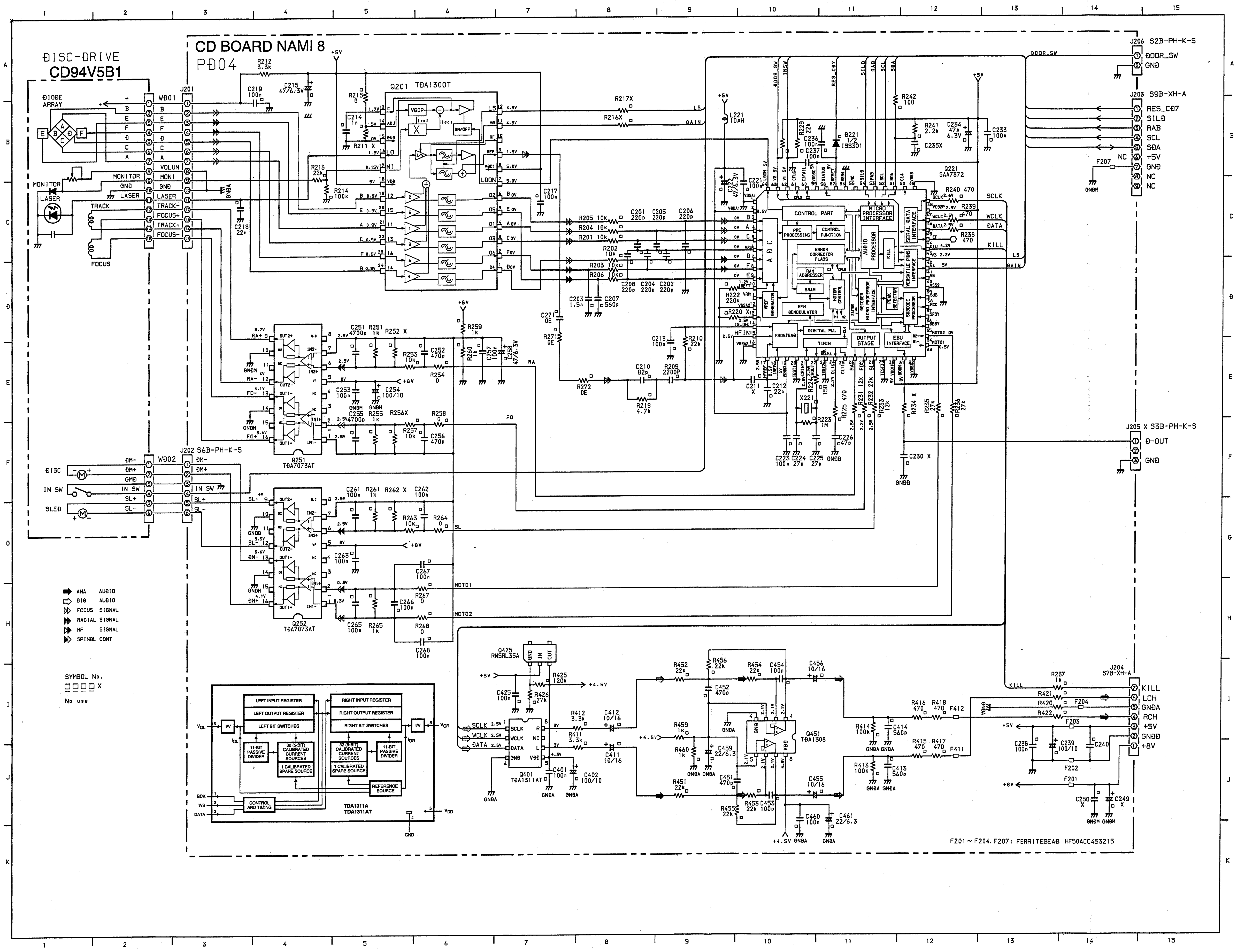
| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C201 C3 | C212 B4 | C224 C4 | C238 D1 | C255 C5 | C268 B4 | C451 A2 | C461 A2 | F208 D5 | L451 C2 | Q475 B2 | R212 D3 | R224 B4 | R237 A3 | R256 C5 | R267 B4 | R411 A3 | R421 C2 | R456 A2 | R476 C3 |
| C202 C3 | C213 C4 | C225 B4 | C239 D1 | C256 C5 | C271 C4 | C452 A2 | C475 A4 | F411 B2 | Q201 C3 | R201 C4 | R213 D3 | R225 B3 | R238 A3 | R257 C5 | R268 D5 | R412 B2 | R422 C2 | R457 B2 | X221 B5 |
| C203 C4 | C214 D3 | C226 B4 | C240 C1 | C257 B4 | C272 C4 | C453 A2 | D221 B3 | F412 B2 | Q221 B3 | R202 C4 | R214 C3 | R229 B3 | R240 B3 | R258 C5 | R269 C4 | R413 B2 | R423 A4 | R458 A2 | |
| C204 C4 | C215 C2 | C229 C5 | | C258 B5 | C401 A3 | C454 A2 | F201 D5 | J201 D2 | Q251 C4 | R203 C3 | R215 D2 | R230 B4 | R241 B3 | R259 B4 | R271 C4 | R414 B2 | R425 A4 | R459 A2 | |
| C205 C3 | C217 C3 | C230 B4 | C249 D5 | C261 B5 | C402 A3 | C455 B2 | F202 C2 | J202 A5 | Q252 A4 | R204 C3 | R216 C3 | R231 B4 | R242 C4 | R260 B5 | R272 C3 | R415 B2 | R426 A2 | R460 B2 | |
| C206 C3 | C218 D2 | C233 B3 | C250 D5 | C262 B5 | C411 A3 | C456 B2 | F203 C1 | J203 A1 | Q271 C4 | R205 C4 | R217 C4 | R232 B4 | R251 C4 | R261 B5 | R281 C3 | R416 B2 | R451 A2 | R461 B2 | |
| C207 C4 | C219 D3 | C234 A3 | C251 C4 | C263 A4 | C412 A3 | C457 B2 | F204 B1 | J204 C1 | Q401 A3 | R206 C4 | R219 C4 | R233 B4 | R252 C4 | R262 B5 | R282 C4 | R417 B2 | R452 A2 | R462 B2 | |
| C208 C4 | C221 C3 | C235 B3 | C252 C4 | C265 B4 | C413 B2 | C458 B2 | F205 A1 | J205 B5 | Q425 A4 | R209 C4 | R220 C4 | R234 B4 | R253 C4 | R263 B5 | R283 C3 | R418 C2 | R453 A2 | R471 B2 | |
| C210 C4 | C222 C3 | C236 B3 | C253 C5 | C266 B4 | C414 B2 | C459 A2 | F206 B1 | J206 A1 | Q451 A2 | R210 D3 | R222 B4 | R235 B4 | R254 C5 | R264 B4 | R284 C3 | R419 C2 | R454 A2 | R472 B1 | |
| C211 C4 | C223 B4 | C237 B3 | C254 C5 | C267 B4 | C425 A4 | C460 A2 | F207 D5 | L221 C3 | Q471 B2 | R211 D3 | R223 B4 | R236 A4 | R255 C5 | R265 B4 | R286 A3 | R420 C2 | R455 B2 | R475 B1 | |

**NAMI 8 BOARD component side view**



**NAMI 8 BOARD copper side view**




DISC-DRIVE
CD94V5B1
CD BOARD NAMI 8
PD04
DIODE ARRAY
MONITOR
LASER
TRACK
FOCUS
WD01
J201
WD02
J202 S6B-PH-K-S
DISC
IN SW
SLED
Q201 TDA1300T
Q221 SAA7372
Q251 TDA7073AT
Q252 TDA7073AT
Q401 TDA1311AT
Q425 RN5RL35A
Q451 TDA1308
J206 S2B-PH-K-S
DOOR_SW
GND
J203 S9B-XH-A
RES_CD7
SILD
RAB
SCL
SDA
+5V
GND
NC
J205 X S3B-PH-K-S
D-OUT
J204 S7B-XH-A
KILL
LCH
GNDA
RCH
+5V
GNDD
+8V
SCLK
WCLK
DATA
ANA AUDIO
DIG AUDIO
FOCUS SIGNAL
RADIAL SIGNAL
HF SIGNAL
SPINDL CONT
SYMBOL No.
□□□□X
No use
LEFT INPUT REGISTER
LEFT OUTPUT REGISTER
LEFT BIT SWITCHES
RIGHT INPUT REGISTER
RIGHT OUTPUT REGISTER
RIGHT BIT SWITCHES
11-BIT PASSIVE DIVIDER
32 (5-BIT) CALIBRATED CURRENT SOURCES
1 CALIBRATED SPARE SOURCE
REFERENCE SOURCE
CONTROL AND TIMING
TDA1311A
TDA1311AT
CONTROL PART
PRE PROCESSING
CONTROL FUNCTION
MICRO PROCESSOR INTERFACE
SERIAL DATA INTERFACE
ERROR CORRECTOR FLAGS
AUDIO PROCESSOR
KILL
VERSATILE PINS INTERFACE
RAM ADDRESSER
SRAM
MOTOR CONTROL
DECODER MICRO PROCESSOR INTERFACE
PEAK DETECTOR
SUBCODE PROCESSOR
VREF GENERATOR
EFM DEMODULATOR
FRONTEND
DIGITAL PLL
TIMING
OUTPUT STAGE
EBU INTERFACE
ADC
F201 ~ F204, F207: FERRITEBEAD HF50ACC453215

| | |
|---|---|
| C201 | C8 |
| C202 | C9 |
| C203 | D8 |
| C204 | C8 |
| C205 | C9 |
| C206 | C9 |
| C207 | D8 |
| C208 | C8 |
| C210 | E8 |
| C211 | E10 |
| C212 | E10 |
| C213 | E9 |
| C214 | B5 |
| C215 | A4 |
| C217 | C7 |
| C218 | C3 |
| C219 | A4 |
| C222 | C9 |
| C223 | F10 |
| C224 | F10 |
| C225 | F10 |
| C226 | F11 |
| C230 | F12 |
| C233 | B13 |
| C234 | B12 |
| C235 | B12 |
| C236 | B11 |
| C237 | B10 |
| C238 | J13 |
| C239 | J13 |
| C240 | J14 |
| C245 | I7 |
| C249 | J14 |
| C250 | J14 |
| C251 | E5 |
| C252 | E6 |
| C253 | E5 |
| C254 | E5 |
| C255 | F5 |
| C256 | F6 |
| C257 | E6 |
| C258 | E7 |
| C261 | G5 |
| C262 | G6 |
| C263 | G5 |
| C265 | H5 |
| C266 | H5 |
| C267 | G6 |
| C268 | H6 |
| C271 | D7 |
| C401 | J7 |
| C402 | J7 |
| C411 | J8 |
| C412 | I8 |
| C413 | J11 |
| C414 | I11 |
| C451 | J10 |
| C452 | I9 |
| C453 | J10 |
| C454 | I10 |
| C455 | J10 |
| C456 | I10 |
| C459 | J9 |
| C460 | J10 |
| C461 | J11 |
| D221 | B11 |
| F201 | J14 |
| F202 | J14 |
| F203 | I14 |
| F204 | I14 |
| F207 | B14 |
| F411 | J12 |
| F412 | I12 |
| J201 | B3 |
| J202 | F3 |
| J203 | B14 |
| J204 | I14 |
| J205 | F14 |
| J206 | A14 |
| L221 | B9 |
| Q201 | C5 |
| Q221 | D11 |
| Q251 | E4 |
| Q252 | G4 |
| Q401 | J7 |
| Q425 | H7 |
| Q451 | I10 |
| R201 | C8 |
| R202 | D8 |
| R203 | D8 |
| R204 | C8 |
| R205 | C8 |
| R206 | D8 |
| R209 | E9 |
| R210 | E9 |
| R211 | B5 |
| R212 | A4 |
| R213 | B4 |
| R214 | C4 |
| R215 | A5 |
| R216 | B8 |
| R217 | B8 |
| R219 | E8 |
| R220 | D9 |
| R222 | D9 |
| R223 | F10 |
| R224 | E10 |
| R225 | E11 |
| R229 | B10 |
| R231 | E11 |
| R232 | E11 |
| R233 | E11 |
| R234 | E12 |
| R235 | E12 |
| R236 | E12 |
| R238 | C12 |
| R239 | C12 |
| R240 | C12 |
| R241 | B12 |
| R242 | B11 |
| R251 | E5 |
| R252 | E5 |
| R253 | E5 |
| R254 | E6 |
| R255 | F5 |
| R256 | F5 |
| R257 | F5 |
| R258 | F6 |
| R259 | D6 |
| R260 | E6 |
| R261 | G5 |
| R262 | G5 |
| R263 | G5 |
| R264 | G6 |
| R265 | H5 |
| R267 | H6 |
| R268 | H6 |
| R271 | D7 |
| R272 | E8 |
| R411 | J8 |
| R412 | I8 |
| R413 | J11 |
| R414 | I11 |
| R415 | J12 |
| R416 | I12 |
| R417 | J12 |
| R418 | I12 |
| R420 | I13 |
| R421 | I13 |
| R422 | I13 |
| R425 | I7 |
| R426 | I7 |
| R451 | J9 |
| R452 | I9 |
| R453 | J10 |
| R454 | I10 |
| R455 | J10 |
| R456 | I9 |
| R459 | I9 |
| R460 | J9 |
| X221 | E10 |

(VERS. :VERSION, U:U.S.A., F:JAPAN, K:FAR EAST, **:EUROPE)

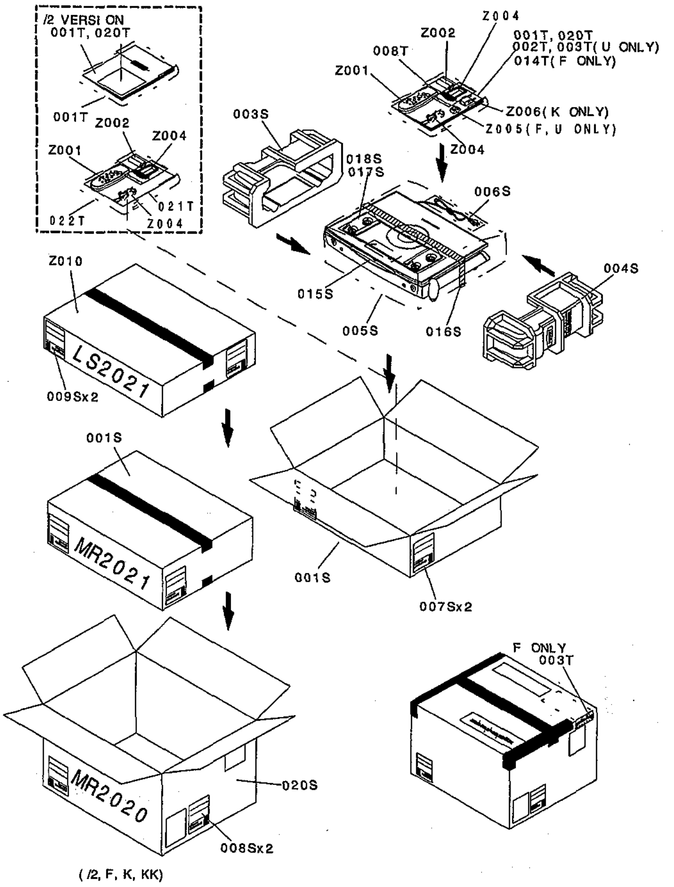
| POS. NO | VERS. COLOR | PART NO. (FOR PCS) | DESCRIPTION | PART NO. (MJI) |
|---|---|---|---|---|
| | | | **PD04-CD SERVO DECODER DAC CIRCUIT BOARD**<br>**PD04-CAPACITORS** | |
| C201 | | 4822 126 13883 | CER. CHIP 220pF ±5% CG 50V | DD95221300 |
| C202 | | 4822 126 13883 | CER. CHIP 220pF ±5% CG 50V | DD95221300 |
| C203 | | 4822 126 12495 | CER. CHIP 1500pF ±10% | DK96152300 |
| C204 | | 4822 126 13883 | CER. CHIP 220pF ±5% CG 50V | DD95221300 |
| C205 | | 4822 126 13883 | CER. CHIP 220pF ±5% CG 50V | DD95221300 |
| C206 | | 4822 126 13883 | CER. CHIP 220pF ±5% CG 50V | DD95221300 |
| C207 | | 4822 126 14249 | CER. CHIP 560pF ±10% | DK96561300 |
| C208 | | 4822 126 13883 | CER. CHIP 220pF ±5% CG 50V | DD95221300 |
| C210 | | 4822 122 33788 | CER. CHIP 82pF ±5% | DD95820300 |
| C212 | | 4822 126 11567 | CER. CHIP 0.022μF ±10% XTR | DK96223200 |
| C213 | | 4822 126 11687 | CER. CHIP 0.1μF +80%-20% | DK98104200 |
| C214 | | 4822 126 12516 | CER. CHIP 1000pF ±10% B 50V | DK96102300 |
| C215 | | 4822 124 11131 | ELECT CHIP 47μF 6.3V | EY47600620 |
| C217 | | 4822 126 11687 | CER. CHIP 0.1μF +80%-20% | DK98104200 |
| C218 | | 4822 126 11567 | CER. CHIP 0.022μF ±10 % XTR | DK96223200 |
| C219 | | 4822 126 11687 | CER. CHIP 0.1μF +80%-20% | DK98104200 |
| C221 | | 4822 126 11687 | CER. CHIP 0.1μF +80%-20% | DK98104200 |
| C222 | | 4822 124 11131 | ELECT CHIP 47μF 6.3V | EY47600620 |
| C223 | | 4822 126 11687 | CER. CHIP 0.1μF +80%-20% | DK98104200 |
| C224 | | 4822 126 11669 | CER. CHIP 27pF ±5% | DD95270300 |
| C225 | | 4822 126 11669 | CER. CHIP 27pF ±5% | DD95270300 |
| C226 | | 4822 122 33777 | CER. CHIP 47pF ±5% C6 50V | DD95470300 |
| C233 | | 4822 126 11687 | CER. CHIP 0.1μF +80%-20% | DK98104200 |
| C234 | | 4822 124 11131 | ELECT CHIP 47μF 6.3V | EY47600620 |
| C236 | | 4822 126 11687 | CER. CHIP 0.1μF +80%-20% | DK98104200 |
| C237 | | 4822 126 11687 | CER. CHIP 0.1μF +80%-20% | DK98104200 |
| C238 | | 4822 126 11687 | CER. CHIP 0.1μF +80%-20% | DK98104200 |
| C239 | | 4822 124 11432 | ELECT CHIP 100μF 10V | EY10701020 |
| C251 | | 4822 126 11685 | CER. CHIP 4700pF ±10% | DK96472300 |
| C252 | | 4822 126 11568 | CER. CHIP 470pF ±10% | DK96471300 |
| C253 | | 4822 126 11687 | CER. CHIP 0.1μF +80%-20% | DK98104200 |
| C254 | | 4822 124 11432 | ELECT CHIP 100μF 10V | EY10701020 |
| C255 | | 4822 126 11685 | CER. CHIP 4700pF ±10% | DK96472300 |
| C256 | | 4822 126 11568 | CER. CHIP 470pF ±10% | DK96471300 |
| C257 | | 4822 126 11687 | CER. CHIP 0.1μF +80%-20% | DK98104200 |
| C258 | | 4822 124 11131 | ELECT CHIP 47μF 6.3V | EY47600620 |
| C261 | | 4822 126 11687 | CER. CHIP 0.1μF +80%-20% | DK98104200 |
| C262 | | 4822 126 11687 | CER. CHIP 0.1μF +80%-20% | DK98104200 |
| C263 | | 4822 126 11687 | CER. CHIP 0.1μF +80%-20% | DK98104200 |
| C265<br>∫<br>C268 | | 4822 126 11687 | CER. CHIP 0.1μF +80%-20% | DK98104200 |
| C271 | | 4822 116 82487 | CHIP 0Ω ±5% 1/16W | NN05000610 |
| C401 | | 4822 126 11687 | CER. CHIP 0.1μF +80%-20% | DK98104200 |
| C402 | | 4822 124 11432 | ELECT CHIP 100μF 10V | EY10701020 |
| C411 | | 4822 124 11074 | ELECT CHIP 10μF 16V | EY10601620 |
| C412 | | 4822 124 11074 | ELECT CHIP 10μF 16V | EY10601620 |
| C413 | | 4822 126 14249 | CER. CHIP 560pF ±10% | DK96561300 |
| C414 | | 4822 126 14249 | CER. CHIP 560pF ±10% | DK96561300 |
| C425 | | 4822 126 11687 | CER. CHIP 0.1μF +80%-20% | DK98104200 |
| C451 | | 4822 126 11568 | CER. CHIP 470pF ±10% | DK96471300 |
| C452 | | 4822 126 11568 | CER. CHIP 470pF ±10% | DK96471300 |
| C453 | | 4822 126 11759 | CER. CHIP 100pF ±5% | DD95101300 |
| C454 | | 4822 126 11759 | CER. CHIP 100pF ±5% | DD95101300 |
| C455 | | 4822 124 11074 | ELECT CHIP 10μF 16V | EY10601620 |
| C456 | | 4822 124 11074 | ELECT CHIP 10μF 16V | EY10601620 |
| C459 | | 4822 124 11226 | ELECT CHIP 22μF 6.3V | EY22600620 |
| C460 | | 4822 126 11687 | CER. CHIP 0.1μF +80%-20% | DK98104200 |
| C461 | | 4822 124 11226 | ELECT CHIP 22μF 6.3V | EY22600620 |

| POS. NO | VERS. COLOR | PART NO. (FOR PCS) | DESCRIPTION | PART NO. (MJI) |
|---|---|---|---|---|
| | | | **PD04-RESISTORS** | |
| R201<br>∫<br>R206 | | 4822 051 30103 | CHIP 10kΩ ±5% 1/16W | NN05103610 |
| R209 | | 4822 126 12339 | CER. 2200pF 10% | DK96222300 |
| R210 | | 4822 051 30223 | CHIP 22kΩ ±5% 1/16W | NN05223610 |
| R212 | | 4822 051 30332 | CHIP 3.3kΩ ±5% 1/16W | NN05332610 |
| R213 | | 4822 051 30223 | CHIP 22kΩ ±5% 1/16W | NN05223610 |
| R214 | | 4822 051 30104 | CHIP 100kΩ ±5% 1/16W | NN05104610 |
| R215 | | 4822 116 82487 | CHIP 0Ω ±5% 1/16W | NN05000610 |
| R219 | | 4822 051 30472 | CHIP 4.7kΩ ±5% 1/16W | NN05472610 |
| R222 | | 4822 051 30224 | CHIP 220kΩ ±5% 1/16W | NN05224610 |
| R223 | | 4822 051 30105 | CHIP 1MΩ ±5% 1/16W | NN05105610 |
| R224 | | 4822 051 30151 | CHIP 150Ω ±5% 1/16W | NN05151610 |
| R225 | | 4822 051 30471 | CHIP 470Ω ±5% 1/16W | NN05471610 |
| R229 | | 4822 051 30223 | CHIP 22kΩ ±5% 1/16W | NN05223610 |
| R231 | | 4822 116 83208 | CHIP 12kΩ ±5% 1/16W | NN05123610 |
| R232 | | 4822 051 30223 | CHIP 22kΩ ±5% 1/16W | NN05223610 |
| R233 | | 4822 116 83208 | CHIP 12kΩ ±5% 1/16W | NN05123610 |
| R235 | | 4822 051 30273 | CHIP 27kΩ ±5% 1/16W | NN05273610 |
| R236 | | 4822 051 30273 | CHIP 27kΩ ±5% 1/16W | NN05273610 |
| R238 | | 4822 051 30471 | CHIP 470Ω ±5% 1/16W | NN05471610 |
| R239 | | 4822 051 30471 | CHIP 470Ω ±5% 1/16W | NN05471610 |
| R240 | | 4822 051 30471 | CHIP 470Ω ±5% 1/16W | NN05471610 |
| R241 | | 4822 051 30222 | CHIP 2.2kΩ ±5% 1/16W | NN05222610 |
| R242 | | 4822 051 30101 | CHIP 100Ω ±5% 1/16W | NN05101610 |
| R251 | | 4822 051 30102 | CHIP 1kΩ ±5% 1/16W | NN05102610 |
| R253 | | 4822 051 30103 | CHIP 10kΩ ±5% 1/16W | NN05103610 |
| R254 | | 4822 116 82487 | CHIP 0Ω ±5% 1/16W | NN05000610 |
| R255 | | 4822 051 30102 | CHIP 1kΩ ±5% 1/16W | NN05102610 |
| R257 | | 4822 051 30103 | CHIP 10kΩ ±5% 1/16W | NN05103610 |
| R258 | | 4822 116 82487 | CHIP 0Ω ±5% 1/16W | NN05000610 |
| R259 | | 4822 051 30102 | CHIP 1kΩ ±5% 1/16W | NN05102610 |
| R260 | | 4822 051 30102 | CHIP 1kΩ ±5% 1/16W | NN05102610 |
| R261 | | 4822 051 30102 | CHIP 1kΩ ±5% 1/16W | NN05102610 |
| R263 | | 4822 051 30103 | CHIP 10kΩ ±5% 1/16W | NN05103610 |
| R264 | | 4822 116 82487 | CHIP 0Ω ±5% 1/16W | NN05000610 |
| R265 | | 4822 051 30102 | CHIP 1kΩ ±5% 1/16W | NN05102610 |
| R267 | | 4822 116 82487 | CHIP 0Ω ±5% 1/16W | NN05000610 |
| R268 | | 4822 116 82487 | CHIP 0Ω ±5% 1/16W | NN05000610 |
| R271 | | 4822 116 82487 | CHIP 0Ω ±5% 1/16W | NN05000610 |
| R272 | | 4822 116 82487 | CHIP 0Ω ±5% 1/16W | NN05000610 |
| R411 | | 4822 051 30332 | CHIP 3.3kΩ ±5% 1/16W | NN05332610 |
| R412 | | 4822 051 30332 | CHIP 3.3kΩ ±5% 1/16W | NN05332610 |
| R413 | | 4822 051 30104 | CHIP 100kΩ ±5% 1/16W | NN05104610 |
| R414 | | 4822 051 30104 | CHIP 100kΩ ±5% 1/16W | NN05104610 |
| R415<br>∫<br>R418 | | 4822 051 30471 | CHIP 470Ω ±5% 1/16W | NN05471610 |
| R419 | | | FERRITE BEADS BK1608HM102-T | FC90020120 |
| R420 | | | FERRITE BEADS BK1608HM102-T | FC90020120 |
| R421 | | 4822 116 82487 | CHIP 0Ω ±5% 1/16W | NN05000610 |
| R422 | | 4822 116 82487 | CHIP 0Ω ±5% 1/16W | NN05000610 |
| R423 | | 4822 116 82487 | CHIP 0Ω ±5% 1/16W | NN05000610 |
| R425 | | 4822 117 11374 | CHIP 120kΩ ±1% 1/10W | NI01124110 |
| R426 | | 4822 117 12024 | CHIP 27kΩ ±1% 1/10W | NI01273110 |
| R451<br>∫<br>R456 | | 4822 051 30223 | CHIP 22kΩ ±5% 1/16W | NN05223610 |
| R459 | | 4822 051 30102 | CHIP 1kΩ ±5% 1/16W | NN05102610 |
| R460 | | 4822 051 30102 | CHIP 1kΩ ±5% 1/16W | NN05102610 |

(VERS. :VERSION, U:U.S.A., F:JAPAN, K:FAR EAST, **:EUROPE)

| POS. NO | VERS. COLOR | PART NO. (FOR PCS) | DESCRIPTION | PART NO. (MJI) |
|---|---|---|---|---|
| | | | **PD04-SEMICONDUCTORS** | |
| D221 | | 4822 130 83715 | CHIP DIODE 1SS301 DAN202U | HZ21005000 |
| Q201 | | 4822 209 16855 | IC TDA1300T HF AMP AND LASER CONT | HC10172490 |
| Q221 | | 4822 209 91174 | IC SAA7372GP SERVO | HC10132490 |
| Q251 | | 4822 209 16372 | IC TDA7073AT DUAL BTL DRIVER | HC10165490 |
| Q252 | | 4822 209 16372 | IC TDA7073AT DUAL BTL DRIVER | HC10165490 |
| Q401 | | 4822 209 32196 | IC TDA1311AT CC-DAC | HC10173490 |
| Q425 | | 4822 209 15595 | IC RN5RL35AA V-REGULATOR 3.5V | HC10021770 |
| Q451 | | 4822 209 33165 | IC TDA1308 POWER OP AMP | HC10138490 |
| | | | **PD04-MISCELLANEOUS** | |
| F201<br>∫<br>F207 | | 4822 157 10313 | HF50ACC453215 | FN31020010 |
| L221 | | 4822 157 53872 | CHIP INDUCTANCE NL322522-100K | LU12103010 |
| WD01 | | 4822 320 12646 | JUMPER LEAD FFC | YU15073500 |
| X221 | | 4822 242 11017 | CRYSTAL CM309S 8.4672MHz | JX08001320 |

# 9. EXPLODED VIEW AND PARTS LIST


/2 VERSI ON
001T, 020T
001T
Z002
Z004
Z001
021T
022T
Z004
Z004
Z002
008T
001T, 020T
002T, 003T( U ONLY)
014T( F ONLY)
Z001
Z006( K ONLY)
Z005( F, U ONLY)
Z004
003S
018S
017S
006S
004S
Z010
015S
005S
016S
LS2021
009Sx2
001S
MR2021
001S
007Sx2
F ONLY
003T
MR2020
020S
008Sx2
( /2, F, K, KK)

(VERS. :VERSION, U:U.S.A., F:JAPAN, K:FAR EAST, **:EUROPE)

| POS. NO | VERS. COLOR | PART NO. (FOR PCS) | DESCRIPTION | PART NO. (MJI) |
|---|---|---|---|---|
| | | | **PACKING** | |
| 001T | F | | USER GUIDE | 298J851110 |
| 001T | K | | USER GUIDE | 298J851350 |
| 001T | KK | | USER GUIDE | 298J851360 |
| 001T | /2 | 4822 736 16729 | USER GUIDE | 298J851310 |
| 001T | U | | USER GUIDE | 298J851250 |
| Z001 | | 4822 219 10669 | REMOTE COMMANDER RC2020MR | ZK298J0010 |

| POS. NO | VERS. COLOR | PART NO. (FOR PCS) | DESCRIPTION | PART NO. (MJI) |
|---|---|---|---|---|
| | | | **NOT STANDARD SPARE PARTS** | |
| 001S | F,U | | PACKING CASE MR2021 | 298J801010 |
| 003S | F,U | | CUSHION L | 298J809010 |
| 004S | F,U | | CUSHION R | 298J809020 |
| 020S | F | | MASTER CARTON CASE MR2020 | 298J801030 |
| 010T | | | CLAMPER ASSY | 298J005500 |
| 014T | F | | USER'S CARD | 145J865210 |
| 020T | F | | LABEL FLY SHEET JAPANESE | 298J861110 |
| 020T | /2,K, KK,U | | LABEL FLY SHEET ENGL1S4 | 298J861120 |
| 021T | /2 | | SHEET FOR REMOCON ETC | 298J107040 |
| 055T | | | SCHEMATIC DIAGRAM | 298J493A00 |
| Z002 | F | | BATTERY UM-4NEPH/2S | ZF24302000 |
| Z003 | | | AM LOOP ANTENNA LA-700HB | LA00055020 |
| Z004 | F | 4822 303 30314 | FM FEEDER ANTENNA | ZA02000070 |
| Z004 | /2,K, KK | | FM ANTENNA 931222R | ZA02800020 |
| Z004 | U | 4822 303 30314 | FM FEEDER ANTENNA | ZA02000070 |
| Z005 | F,U | 4822 264 30265 | PLUG ANT ADAPTER FM | YP90000310 |
| Z006 | K | 4822 265 10092 | JACK AC ADAPTER S-I6116 PLRTY | YJ04001240 |
| Z007 | F,K,KK | | SPEAKER BOX SPK SYSTEM | AS20100180 |
| Z007 | U | | SPEAKER BOX SPK SYSTEM | AS20100190 |
| Z008 | | | BADGE MARANTZ | 354H251230 |
| Z010 | F, | | PACKING CASE FOR SPEAKER LS2021 | 298J801020 |

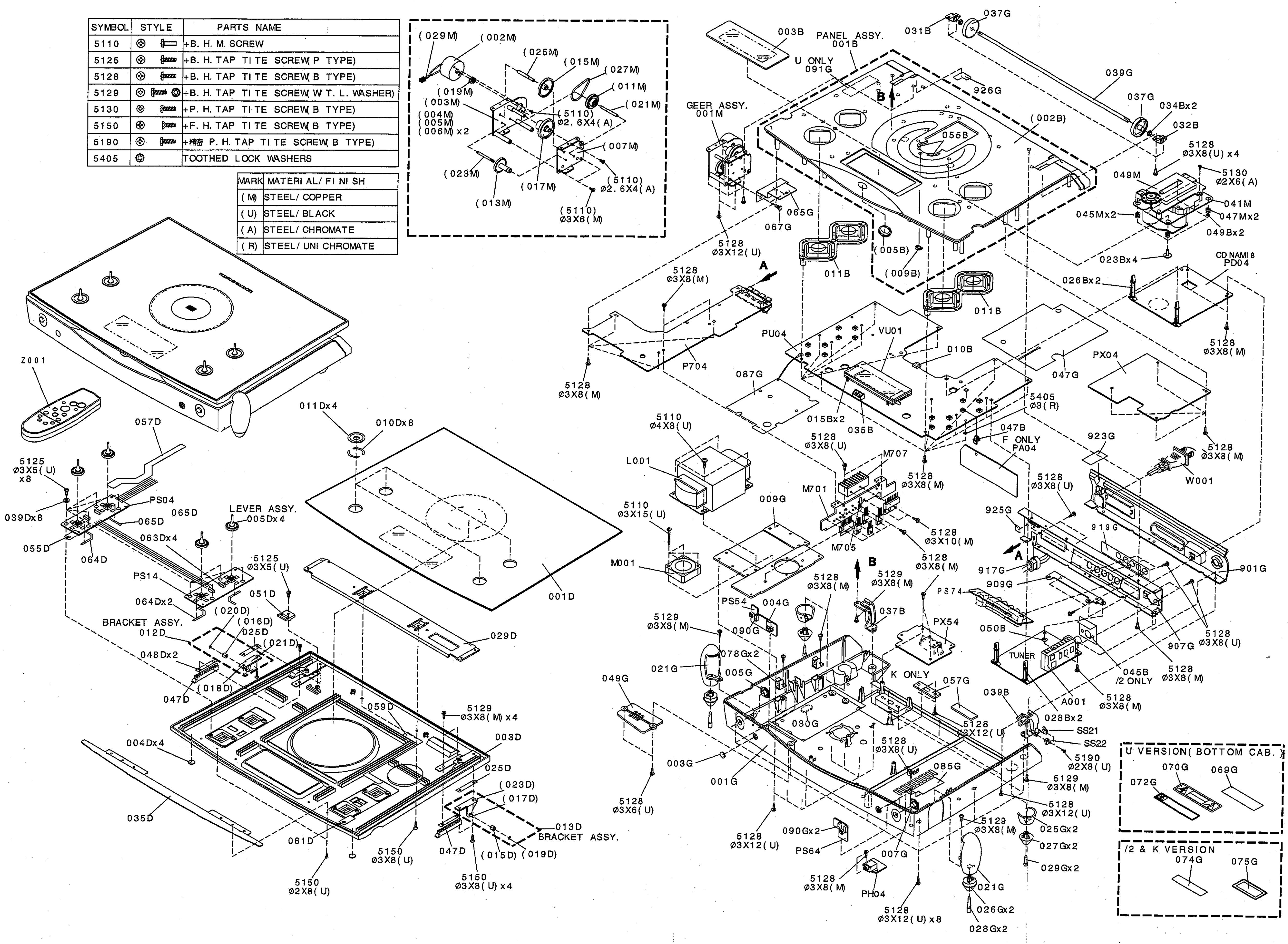
(VERS. :VERSION, U:U.S.A., F:JAPAN, K:FAR EAST, **:EUROPE)

| POS. NO | VERS. COLOR | PART NO. (FOR PCS) | DESCRIPTION | PART NO. (MJI) |
|---|---|---|---|---|
| 001B | F,K,KK,U | | FRONT PANEL ASSY | 298J248510 |
| 001B | /2 | 4822 466 12193 | FRONT PANEL ASSY | 298J248500 |
| 002B | F,K,KK,U | | FRONT PANEL | 298J248020 |
| 002B | /2 | | FRONT PANEL | 298J248010 |
| 003B | | 4822 450 10615 | WINDOW FL | 298J158040 |
| 005B | | | LENS SENSOR | 298J355020 |
| 009B | | | LENS DSC SENS | 298J355030 |
| 011B | | 4822 410 12282 | BUTTON TOP | 298J270010 |
| 023B | | | SCREW FOR CD MECHA | 183J010010 |
| 031B | | 4822 404 10992 | SUSTAINER L | 298J106020 |
| 032B | | 4822 404 10991 | SUSTAINER R | 298J106030 |
| 034B | | 4822 520 10859 | SUSTAINER BEARING | 298J106060 |
| 037B | | 4822 528 11315 | CAM L | 298J054010 |
| 039B | | 4822 528 11316 | CAM R | 298J054020 |
| 049B | | | WASHER FOR CD MECHA REAR | 298J012010 |
| 052B | | | COVER FOR GEAR ASSY | 298J053020 |
| 055B | | | BUFFER FOR CD | 298J056070 |
| 001D | F,K,KK,U | | WINDOW | 298J158030 |
| 001D | /2 | 4822 466 10616 | WINDOW | 298J158010 |
| 003D | | 4822 466 12194 | LID | 298J257010 |
| 004D | | | BUFFER FOR LID | 298J056020 |
| 005D | | 4822 402 11277 | LEVER ASSY | 298J354500 |
| 010D | | | STICKER ADHESIVE FOR 011D | 298J122010 |
| 011D | | 4822 462 11164 | CAP FOR WINDOW | 298J067030 |
| 012D | | 4822 402 11278 | BRACKET ROLLER ASSY L | 298J160520 |
| 013D | | 4822 402 11279 | BRACKET ROLLER ASSY R | 298J160530 |
| 015D | | | ROLLER LID | 298J358010 |
| 016D | | | ROLLER LID | 298J358010 |
| 019D | | 4822 530 70122 | RG RING E RING | 64000200R0 |
| 020D | | 4822 530 70122 | RG RING E RING | 64000200R0 |
| 047D | | 4822 522 10751 | GEAR FOR LID | 298J058020 |
| 067D | | | BUFFER FOR SHIELD | 345S056030 |
| 001G | | 4822 442 01753 | CASE BOTTOM | 298J064010 |
| 003G | | 4822 381 12069 | LENS IR | 298J355010 |
| 005G | | 4822 410 12283 | BUTTON FRONT STANDBY | 298J270020 |
| 007G | | 4822 410 12282 | BUTTON FRONT OPEN/CLOSE | 298J270030 |
| 021G | | 4822 462 11165 | LEG FRONT | 298J057010 |
| 025G | | 4822 462 11166 | LEG REAR | 298J057020 |
| 026G | | 4822 462 11167 | LEG FOR FRONT | 298J057050 |
| 027G | | 4822 462 11168 | LEG FOR REAR | 298J057030 |
| 028G | | 4822 535 10629 | PIN FOR FRONT LEG | 298J254020 |
| 029G | | 4822 535 10631 | PIN FOR REAR LEG | 298J254010 |
| 030G | | | LEG SUB | 298J057040 |
| 037G | | 4822 522 10752 | GEAR E | 298J058010 |
| 049G | | 4822 442 01754 | LID BOTTOM | 298J257020 |
| 901G | F | | REAR PANEL | 298J250020 |
| 901G | K | | REAR PANEL | 298J250040 |
| 901G | KK | | REAR PANEL | 298J250050 |
| 901G | /2 | | REAR PANEL | 298J250010 |
| 901G | U | | REAR PANEL | 298J250030 |
| 917G | | 4822 532 60948 | BUSHING AC MAINS | 450H259010 |
| 001M | | 4822 522 10753 | MECHANISM GEAR ASSY | 298J304510 |
| 002M | | 4822 361 30368 | D.C MOTOR | MM00460020 |
| 011M | | 4822 522 10754 | GEAR A | 298J058100 |
| 013M | | 4822 522 10755 | GEAR B | 298J058110 |
| 015M | | 4822 522 10756 | GEAR C | 298J058120 |
| 017M | | 4822 522 10757 | GEAR D | 298J058130 |
| 019M | | | PULLEY | 298J262100 |
| 021M | | | SHAFT A | 298J112100 |
| 023M | | | SHAFT B | 298J112110 |
| 027M | | 4822 358 10273 | BELT | 298J264100 |
| 041M | | 4822 691 10781 | MECHANISM CD MECHA ASSY | 298J304500 |

| POS. NO | VERS. COLOR | PART NO. (FOR PCS) | DESCRIPTION | PART NO. (MJI) |
|---|---|---|---|---|
| 045M | | 4822 529 10428 | DAMPER SUSPENSION RUBBER A | 298J130010 |
| 047M | | 4822 529 10429 | DAMPER SUSPENSION RUBBER B | 298J130020 |
| 049M | | | COVER CD MECHA | 298J053010 |
| FH01 | /2 | | FERRITE CORE ZCAT1325-0530A CLAMP | FC50200020 |
| ⚠ L001 | F | | MAINS TRANSF. AC100V | TS17206010 |
| ⚠ L001 | K | | MAINS TRANSF. AC110-220V | TS17206040 |
| ⚠ L001 | KK | | MAINS TRANSF. AC220V | TS17206050 |
| ⚠ L001 | /2 | 4822 146 11124 | MAINS TRANSF. AC230V | TS17206030 |
| ⚠ L001 | U | | MAINS TRANSF. AC120V | TS17206020 |
| M001 | | 4822 361 11159 | D.C MOTOR BRUSHLESS FAN KD1204PFB2-8 | MM01200290 |
| M705 | | | LEAF SPRING | 298J116010 |
| SS21 | | 4822 271 30768 | MINI SW. DOOR CLOSE | SM01011530 |
| SS22 | | 4822 271 30768 | MINI SW. DOOR OPEN | SM01011530 |
| WU03 | | 4822 320 12647 | JUMPER LEAD 8P FFC JS02-JS11 | YU08238500 |
| WU04 | | 4822 320 12648 | JUMPER LEAD 13P FFC JU10-JS01 | YU13268500 |
| ⚠ W001 | F | 4822 321 11359 | A.C MAINS CORD | YC01800800 |
| ⚠ W001 | K,U | | A.C MAINS CORD AC250V 10A | YC01800880 |
| ⚠ W001 | KK | | A.C MAINS CORD 3A 250V | YC02000820 |
| ⚠ W001 | /2 | 4822 321 11343 | A.C MAINS CORD | YC01800790 |

| SYMBOL | STYLE | PARTS NAME |
|---|---|---|
| 5110 | ⊕ | +B. H. M. SCREW |
| 5125 | ⊕ | +B. H. TAP TITE SCREW(P TYPE) |
| 5128 | ⊕ | +B. H. TAP TITE SCREW(B TYPE) |
| 5129 | ⊕ | +B. H. TAP TITE SCREW(W T. L. WASHER) |
| 5130 | ⊕ | +P. H. TAP TITE SCREW(B TYPE) |
| 5150 | ⊕ | +F. H. TAP TITE SCREW(B TYPE) |
| 5190 | ⊕ | +精密 P. H. TAP TITE SCREW(B TYPE) |
| 5405 | ⚙ | TOOTHED LOCK WASHERS |

| MARK | MATERIAL/FINISH |
|---|---|
| (M) | STEEL/COPPER |
| (U) | STEEL/BLACK |
| (A) | STEEL/CHROMATE |
| (R) | STEEL/UNI CHROMATE |


(029M)
(002M)
(025M)
(015M)
(027M)
(011M)
(021M)
(019M)
(003M)
(004M)
(005M)
(006M) x2
(5110)
Ø2.6X4(A)
(007M)
(023M)
(017M)
(013M)
(5110)
Ø2.6X4(A)
(5110)
Ø3X6(M)
Z001
057D
5125
Ø3X5(U)
x8
PS04
039Dx8
065D
065D
LEVER ASSY.
005Dx4
055D
064D
063Dx4
PS14
5125
Ø3X5(U)
064Dx2
051D
(020D)
BRACKET ASSY.
012D
(016D)
025D
(021D)
048Dx2
(018D)
047D
011Dx4
010Dx8
001D
029D
059D
5129
Ø3X8(M) x4
003D
004Dx4
025D
(023D)
(017D)
013D
BRACKET ASSY.
035D
061D
047D
(015D)
(019D)
5150
Ø3X8(U)
5150
Ø2X8(U)
5150
Ø3X8(U) x4
003B
PANEL ASSY.
001B
U ONLY
091G
031B
037G
039G
037G
034Bx2
032B
GEER ASSY.
001M
926G
B
(002B)
055B
5128
Ø3X8(U) x4
5130
Ø2X6(A)
049M
041M
045Mx2
047Mx2
049Bx2
065G
067G
5128
Ø3X12(U)
(005B)
(009B)
011B
011B
023Bx4
CD NAMI 8
PD04
026Bx2
A
5128
Ø3X8(M)
P704
5128
Ø3X8(M)
PU04
VU01
010B
087G
047G
PX04
5128
Ø3X8(M)
015Bx2
035B
5405
Ø3(R)
047B
F ONLY
PA04
5110
Ø4X8(U)
5128
Ø3X8(U)
M707
5128
Ø3X8(M)
923G
5128
Ø3X8(M)
W001
L001
M701
009G
5128
Ø3X8(U)
925G
919G
5110
Ø3X15(U)
5128
Ø3X10(M)
M001
M705
B
5128
Ø3X8(M)
A
917G
901G
909G
PS74
5128
Ø3X8(M)
5129
Ø3X8(M)
PS54
004G
037B
5129
Ø3X8(M)
090G
PX54
050B
TUNER
5128
Ø3X8(U)
907G
078Gx2
021G
005G
045B
/2 ONLY
5128
Ø3X8(M)
049G
K ONLY
057G
A001
5128
Ø3X8(M)
039B
028Bx2
SS21
SS22
030G
5128
Ø3X12(U)
5128
Ø3X8(U)
085G
5190
Ø2X8(U)
003G
001G
5129
Ø3X8(M)
5128
Ø3X12(U)
5128
Ø3X6(U)
090Gx2
5129
Ø3X8(M)
025Gx2
027Gx2
029Gx2
5128
Ø3X12(U)
PS64
007G
5128
Ø3X8(M)
PH04
021G
026Gx2
028Gx2
5128
Ø3X12(U) x8
U VERSION(BOTTOM CAB.)
070G
069G
072G
/2 & K VERSION
074G
075G

# 10. ELECTRICAL PARTS LIST

## ASSIGNMENT OF COMMON PARTS CODES.

### *RESISTORS*

R***: 1) GD05 ××× 140, Carbon film fixed resistor, ±5% 1/4W
R***: 2) GD05 ××× 160, Carbon film fixed resistor, ±5% 1/6W
① —— Resistance value

Examples ;
① Resistance value

| | | | |
|---|---|---|---|
| 0.1 Ω .... 001 | 10 Ω .... 100 | 1 kΩ .... 102 | 100 kΩ .... 104 |
| 0.5 Ω .... 005 | 18 Ω .... 180 | 2.7 kΩ .... 272 | 680 kΩ .... 684 |
| 1 Ω .... 010 | 100 Ω .... 101 | 10 kΩ .... 103 | 1 MΩ .... 105 |
| 6.8 Ω .... 068 | 390 Ω .... 391 | 22 kΩ .... 223 | 4.7 MΩ .... 475 |

**Note :** Please distinguish 1/4W from 1/6W by the shape of parts used actually.

### *CAPACITORS*

C***: CERAMIC CAP.
3) DD1 ×××× 370, Ceramic capacitor
Disc type
Temp.coeff.P350 ～N1000, 50V
② ③
③ —— Capacity value
② —— Tolerance

Examples ;
② Tolerance (Capacity deviation)
±0.25 pF .... 0
±0.5 pF .... 1
±5% .... 5

∗ Tolerance of COMMON PARTS handled here are as follows :
0.5 pF～ 5 pF .... ±0.25 pF
6 pF～ 10 pF .... ±0.5 pF
12 pF～ 560 pF .... ±5%

③ Capacity value

| | | |
|---|---|---|
| 0.5 pF .... 005 | 3 pF .... 030 | 100 pF .... 101 |
| 1 pF .... 010 | 10 pF .... 100 | 220 pF .... 221 |
| 1.5 pF .... 015 | 47 pF .... 470 | 560 pF .... 561 |

C*** : CERAMIC CAP.
4) DK16 ××× 300, High dielectric constant ceramic capacitor
Disc type
Temp.chara. 2B4, 50V
④ —— Capacity value

Examples ;
④ Capacity value
100 pF .... 101 1000 pF .... 102 10000 pF .... 103
470 pF .... 471 2200 pF .... 222

C*** : 5) ELECTROLY CAP. ( ⊥̸ ), 6) FILM CAP. ( ⊥ )
5) EA ×××××× 10, Electrolytic capacitor
One-way lead type, Tolerance ±20%
⑤ ⑥
⑥ —— Working voltage
⑤ —— Capacity value

Examples ;
⑤ Capacity value

| | | |
|---|---|---|
| 0.1 µF .... 104 | 4.7 µF .... 475 | 100 µF .... 107 |
| 0.33 µF .... 334 | 10 µF .... 106 | 330 µF .... 337 |
| 1 µF .... 105 | 22 µF .... 226 | 1100 µF .... 118 |
| | | 2200 µF .... 228 |

⑥ Working voltage

| | |
|---|---|
| 6.3V .... 006 | 25V .... 025 |
| 10V .... 010 | 35V .... 035 |
| 16V .... 016 | 50V .... 050 |

6) DF15 ××× 350 → Plastic film capacitor
DF15 ××× 310 One-way type, Mylar ±5% 50V
DF16 ××× 310 → Plastic film capacitor
One-way type, Mylar ±10% 50V
⑦ —— Capacity value

Examples ;
⑦ Capacity value

| | |
|---|---|
| 0.001 µF (1000 pF) ....... 102 | 0.1 µF .... 104 |
| 0.0018 µF ........................ 182 | 0.56 µF .... 564 |
| 0.01 µF ........................ 103 | 1 µF .... 105 |
| 0.015 µF ........................ 153 | |

**NOTE** : 1) The above CODES ( R*** , R*** , C*** , C*** and C ***) are omitted on the schematic diagram in some case.
2) On the occasion, be confirmed the common parts on the parts list.
3) Refer to "Common Parts List" for the other common parts (**RI05, DD4, DK4**).

## NOTE ON SAFETY FOR FUSIBLE RESISTOR :

The suppliers and their type numbers of fusible resistors are as follows;

1. KOA Corporation

| Part No. (MJI) | Type No. (KOA) | Description |
|---|---|---|
| NH05 ××× 140 → | RF25S ×××× ΩJ | (±5% 1/4W) |
| NH05 ××× 120 → | RF50S ×××× ΩJ | (±5% 1/2W) |
| NH85 ××× 110 → | RF73B2A ×××× ΩJ | (±5% 1/10W) |
| NH95 ××× 140 → | RF73B2E ×××× ΩJ | (±5% 1/4W) |

∗ Resistance value — Resistance value (0.1 Ω – 10 kΩ)

2. Matsushita Electronic Components Co., Ltd

| Part No. (MJI) | Type No. (MEC) | Description |
|---|---|---|
| NF05 ××× 140<br>RF05 ××× 140 → | ERD-2FCJ ××× | (±5% 1/4W) |
| NF02 ××× 140<br>RF02 ××× 140 → | ERD-2FCG ××× | (±2% 1/4W) |

∗ Resistance value — ∗ Resistance value

Examples ;
∗ Resistance value

| | | | |
|---|---|---|---|
| 0.1 Ω .... 001 | 10 Ω .... 100 | 1 kΩ .... 102 | 100 kΩ .... 104 |
| 0.5 Ω .... 005 | 18 Ω .... 180 | 2.7 kΩ .... 272 | 680 kΩ .... 684 |
| 1 Ω .... 010 | 100 Ω .... 101 | 10 kΩ .... 103 | 1 MΩ .... 105 |
| 6.8 Ω .... 068 | 390 Ω .... 391 | 22 kΩ .... 223 | 4.7 MΩ .... 475 |

### *ABBREVIATION AND MARKS*

| | | | |
|---|---|---|---|
| ANT. | : ANTENNA | BATT. | : BATTERY |
| CAP. | : CAPACITOR | CER. | : CERAMIC |
| CONN. | : CONNECTING | DIG. | : DIGITAL |
| HP | : HEADPHONE | MIC. | : MICROPHONE |
| µ-PRO | : MICROPROCESSOR | REC. | : RECORDING |
| RES. | : RESISTOR | SPK | : SPEAKER |
| SW | : SWITCH | TRANSF. | : TRANSFORMER |
| TRIM. | : TRIMMING | TRS. | : TRAMSISTOR |
| VAR. | : VARIABLE | X'TAL | : CRYSTAL |

## NOTE ON SAFETY :

Symbol ⚠ Fire or electrical shock hazard. Only original parts should be used to replaced any part marked with symbol ⚠ . Any other component substitution (other than original type), may increase risk of fire or electrical shock hazard.

## 安全上の注意 ：

⚠ がついている部品は、安全上重要な部品です。必ず指定されている部品番号の部品を使用して下さい。

(VERS. :VERSION, U:U.S.A., F:JAPAN, K:FAR EAST, **:EUROPE)

| POS. NO | VERS. COLOR | PART NO. (FOR PCS) | DESCRIPTION | PART NO. (MJI) |
|---|---|---|---|---|
| | | | **P704-MOTOR DRIVE MAIN AMP CIRCUIT BOARD** | |
| | | | **P704-CAPACITORS** | |
| CD01 | | 4822 122 30103 | CER. 0.022µF +80%-20% 50V | DK18223310 |
| CD02 | | 4822 122 30103 | CER. 0.022µF +80%-20% 50V | DK18223310 |
| C701 | | 4822 124 22273 | ELECT. 0.47µF 50V | OA47405020 |
| C702 | | 4822 124 22273 | ELECT. 0.47µF 50V | OA47405020 |
| C721 | | 4822 124 90357 | ELECT. 2.2µF ±20% 50V RA-2 | OA22505020 |
| C722 | | 4822 124 22273 | ELECT. 0.47µF ±20% 50V | OA47405020 |
| C723 | | 4822 122 31205 | CER. 47pF ±5% CH 50V | DD15470300 |
| C724 | | 4822 124 22274 | ELECT. 4.7µF ±20% 50V RA-2 | OA47505020 |
| C725 | | 4822 122 40617 | CER. 0.1µF +80%-20% 50V | DD38104010 |
| C726 | | 4822 124 90357 | ELECT. 2.2µF 50V | OA22505020 |
| C727 | | 4822 124 90362 | ELECT. 22µF 50V ±20% RA2 | OA22605020 |
| C728 | | 4822 126 12496 | CER. 0.01µF +80%-20% 50V | DD38103010 |
| C801 ~ C804 | | 4822 122 30043 | CER. 0.01µF +80%-20% 50V | DK18103310 |
| C805 | | 4822 122 30103 | CER. 0.022µF +80%-20% 50V | DK18223310 |
| C806 | | 4822 124 42367 | ELECT 3300µF 35V RE3 | EA33803570 |
| C807 | | 4822 124 90367 | ELECT. 2200µF 25V | OA22802520 |
| C808 | | 4822 124 22695 | ELECT. 2200µF 35V | OA22803520 |
| C809 | | 4822 124 80582 | ELECT. 4700µF 16V | OA47801620 |
| C810 | | 4822 122 30043 | CER. 0.01µF +80%-20% 50V | DK18103310 |
| C811 | | 4822 124 12399 | ELECT 3300µF 6.3V RE3 | EA33800670 |
| C812 | | 4822 124 41543 | ELECT. 1µF 50V | OA10505020 |
| C814 | | 4822 124 90355 | ELECT. 100µF 50V | OA10705020 |
| C815 | | 4822 124 90362 | ELECT. 22µF 50V | OA22605020 |
| C816 | | 4822 124 90362 | ELECT. 22µF 50V | OA22605020 |
| C818 | | 4822 122 40617 | CER. 0.1 +80%-20% 50V | DD38104010 |
| C819 | | 4822 124 90354 | ELECT. 100µF 16V | OA10701620 |
| C820 | | 4822 124 90354 | ELECT. 100µF 16V | OA10701620 |
| C821 | | 4822 122 30043 | CER. 0.01µF +80%-20% 50V | DK18103310 |
| C851 | | 4822 124 90354 | ELECT. 100µF 16V | OA10701620 |
| C852 | | 4822 124 90352 | ELECT. 10µF 16V | OA10601620 |
| | | | **P704-CAPACITORS (COMMON)** | |
| C*** | | | PLASTIC FILM CAPACITOR ±5% 50V : C703-C710 C813 | |
| | | | **P704-RESISTORS** | |
| R723 | | 4822 050 21022 | 1kΩ ±5% 1/4W | GG05102140 |
| R724 | | 4822 050 21022 | 1kΩ ±5% 1/4W | GG05102140 |
| ⚠ R804 | | 4822 111 90967 | FUSE 4.7Ω 5%1/4W | NF05047140 |
| R809 | | 4822 050 21021 | 100Ω ±5% 1/4W | GG05101140 |
| R810 | | 4822 050 21021 | 100Ω ±5% 1/4W | GG05101140 |
| R825 | | 4822 116 82444 | 0.33Ω ±10% 2W | GO10332020 |
| R851 | | 4822 052 10479 | 47Ω ±5% 1/4W | GG05470140 |
| R853 | | 4822 116 80257 | 6.19kΩ 1% 1/6W | GM11661910 |
| R857 | | 4822 117 13643 | THERMISTOR ERTD2ZHJ103T | HH00033020 |
| | | | **P704-RESISTORS (COMMON)** | |
| R*** | | | CARBON FILM FIXED RES. ±5% 1/6W : R701-R714 R721 R722 R725-R736 R801-R803 R805-R808 R811 R818-R824 R826-R828 R852 R854 -R856 R858 RD01-RD04 | |
| | | | **P704-SEMICONDUCTORS** | |
| DD01 | | 4822 130 10667 | ZENER DIODE 4.7V | HD30471000 |
| D701 ~ D704 | | 4822 130 82421 | DIODE 1D3 1A 200V | HD20002710 |
| D705 | | 4822 130 80322 | ZENER DIODE 15V | HD31501000 |
| D706 | | 4822 130 32362 | DIODE 1SS176 MA165 1SS254 30V 0.1A | HD20002000 |
| D707 | | 4822 130 80132 | ZENER DIODE 3.9V | HD30391000 |
| D708 | | 4822 130 80838 | ZENER DIODE 18V | HD31801000 |
| D709 | | 4822 130 82421 | DIODE 1D3 1A 200V | HD20002710 |
| D710 | | 4822 130 32362 | DIODE 1SS176 MA165 1SS254 30V 0.1A | HD20002000 |
| D711 | | 4822 130 32362 | DIODE 1SS176 MA165 1SS254 30V 0.1A | HD20002000 |
| D801 | | 4822 130 83438 | DIODE D5SB-10 200V 5A | HE20016290 |
| D802 | | 4822 130 33057 | DIODE S2VB20 | HE20011290 |
| D803 ~ D806 | | 4822 130 82421 | DIODE 1D3 1A 200V | HD20002710 |
| D808 | | 4822 130 82421 | DIODE 1D3 1A 200V | HD20002710 |
| D809 | | 4822 130 80272 | ZENER DIODE 7.5V | HD30751000 |
| D810 | | 4822 130 32362 | DIODE 1SS176 MA165 1SS254 30V 0.1A | HD20002000 |
| D811 | | 4822 130 82421 | DIODE 1D3 1A 200V | HD20002710 |
| D812 | | 4822 130 81659 | ZENER DIODE 27V | HD32701000 |
| D813 | | 4822 130 10667 | ZENER DIODE 4.7V | HD30471000 |
| D851 | | 4822 130 80321 | ZENER DIODE 10V | HD31001000 |
| D852 | | 4822 130 83142 | ZENER DIODE 6.2V | HD30621000 |
| D853 | | 4822 130 32362 | DIODE 1SS176 MA165 1SS254 30V 0.1A | HD20002000 |
| QD01 | | 4822 209 83803 | IC LB1641 MOTOR DRIVER | HC10148030 |
| Q701 | | 4822 209 16224 | IC AN7125 POWER AMP | HC10169020 |
| Q702 | | 4822 130 11588 | TRS. 2SA1307 O Y | HT113072A0 |
| Q703 | | 4822 130 43313 | TRS. 2SC3312 R S | HT333122A0 |
| Q704 | | 4822 130 42433 | TRS. 2SA933S R S | HT109332B0 |
| Q705 | | 4822 130 42433 | TRS. 2SA933S R S | HT109332B0 |
| Q706 | | 4822 130 43313 | TRS. 2SC3312 R S | HT333122A0 |
| Q707 | | 4822 130 42433 | TRS. 2SA933S R S | HT109332B0 |
| Q708 | | 4822 130 43313 | TRS. 2SC3312 R S | HT333122A0 |
| Q801 | | 4822 209 17378 | IC PQ30RV2 | HC31930320 |
| Q802 | | 4822 130 61417 | TRS. 2SB1240 TV-2 Q R | HT212402A0 |
| Q803 | | 4822 130 43313 | TRS. 2SC3312 R S | HT333122A0 |
| Q805 | | 4822 209 17379 | IC PQ12RF2 REQ.12V 2A | HC31912320 |
| Q806 | | 4822 209 14623 | IC NJM7808FA 8V 1A | HC38908090 |
| Q807 | | 4822 130 42433 | TRS. 2SA933 R S | HT109332B0 |
| Q851 | | 4822 130 42292 | TRS. 2SC2120 O | HT321201A0 |
| Q852 | | 4822 130 42433 | TRS. 2SA933S R S | HT109332B0 |
| Q853 | | 4822 130 43313 | TRS. 2SC3312 R S | HT333122A0 |
| | | | **P704-MISCELLANEOUS** | |
| ⚠ F803 | F,U | | FUSE 1.6A 125V | FS20160220 |
| ⚠ F803 | /2,K,KK | 4822 071 51602 | FUSE T1.6A 250V | FS20160200 |
| ⚠ F804 | F,U | | FUSE 4.0A 125V UL CSA | FS20400220 |
| ⚠ F804 | /2,K,KK | 4822 071 54002 | FUSE 4.0A 250V VDE SEMKO | FS20400200 |
| ⚠ F805 | F,U | | FUSE T 1.25A 125V UL CSA | FS20125220 |
| ⚠ F805 | /2,K,KK | 4822 071 51252 | FUSE T1.25A 250V | FS20125200 |
| ⚠ F806 | F,U | | FUSE 500mA 125V UL CSA | FS20050220 |
| ⚠ F806 | /2,K,KK | 4822 071 55001 | FUSE T0.5A 250V | FS20050200 |
| J702 | | 4822 290 60752 | TERMINAL 4 PIN PUSH | YT03040330 |
| L701 ~ L704 | | 4822 157 63085 | AIR COIL SPK CHOCK COIL HORIZONTAL TYPE | ML08010010 |
| L707 | /2 | 4822 157 11848 | ZJYS51R5-2P | FN21000060 |
| L708 | /2 | 4822 157 11848 | ZJYS51R5-2P | FN21000060 |
| | | | **P804-POWER SUPPLY CIRCUIT BOARD** | |
| LB01 | | 4822 157 70419 | LF-4D-102 | FN01020020 |
| RB01 | U | | 2.2MΩ ±10% 1/2W FOR UL | RC10225820 |
| SB01 | K | | SLIDE SW. SLIDE 110V-220V | SS02021670 |

(VERS. :VERSION, U:U.S.A., F:JAPAN, K:FAR EAST, **:EUROPE)

| POS. NO | VERS. COLOR | PART NO. (FOR PCS) | DESCRIPTION | PART NO. (MJI) |
|---|---|---|---|---|
| | | | **PA04-AM-STEREO CIRCUIT BOARD [F Version]** | |
| | | | **PA04-CAPACITORS** | |
| CA02 | F | 4822 124 21894 | ELECT 10µF 16V | EJ10601610 |
| CA03 | F | 4822 124 21894 | ELECT 10µF 16V | EJ10601610 |
| CA04 | F | 4822 122 30043 | CER. 0.01µF +80%-20% 50V | DK18103310 |
| CA05 | F | 4822 122 30043 | CER. 0.01µF +80%-20% 50V | DK18103310 |
| CA11 | F | 4822 124 21894 | ELECT 10µF 16V | EJ10601610 |
| CA13 | F | 4822 124 23053 | ELECT 1µF 50V | EJ10505010 |
| CA14 | F | 4822 122 30043 | CER. 0.01µF +80%-20% 50V | DK18103310 |
| CA15 | F | 4822 122 31205 | CER. 47pF ±5% CH 50V BLK | DD15470300 |
| CA16 | F | 4822 124 23056 | ELECT 47µF 16V | EJ47601610 |
| CA20 | F | 4822 124 23056 | ELECT 47µF 16V | EJ47601610 |
| CA21 | F | 4822 122 30043 | CER. 0.01µF +80%-20% 50V | DK18103310 |
| CA22 | F | 4822 124 40786 | ELECT 2.2µF 50V | EJ22505010 |
| CA23 | F | 4822 124 40786 | ELECT 2.2µF 50V | EJ22505010 |
| CA24 | F | 4822 124 23053 | ELECT 1µF 50V | EJ10505010 |
| | | | **PA04-CAPACITORS (COMMON)** | |
| C*** | | | HIGH DIELECTRIC CONSTANT CER. CAPACITOR ±10% 50V : CA01 CA17-CA19 | |
| C*** | | | PLASTIC FILM CAPACITOR ±5% 50V : CA06-CA10 CA12 | |
| | | | **PA04-RESISTOR** | |
| ▲ RA08 | F | | FUSE82 Ω G 1/4W | NF02820140 |
| | | | **PA04-RESISTORS (COMMON)** | |
| R*** | | | CARBON FILM FIXED RES. ±5% 1/6W : RA01-RA07 | |
| | | | **PA04-SEMICONDUCTORS** | |
| DA01 | F | 4822 130 32362 | DIODE 1SS176 MA165 1SS254 30V 0.1A | HD20002000 |
| DA02 | F | 4822 130 32362 | DIODE 1SS176 MA165 1SS254 30V 0.1A | HD20002000 |
| DA03 | F | 4822 130 32362 | DIODE 1SS176 MA165 1SS254 30V 0.1A | HD20002000 |
| QA01 | F | | IC MC13022P AM STEREO | HC10078170 |
| QA02 | F | | IC 74HC4053 C-MOS | HC705300B0 |
| QA03 | F | 4822 130 41947 | TRS. 2SC2458 2SC1740S 2SC3199 ETC. | HT30001000 |
| QA04 | F | 4822 130 42715 | TRS. 2SA1048 2SA933S 2SA1267 ETC. | HT10001000 |
| | | | **PB04-MISCELLANEOUS** | |
| LA01 | F | | I.F.T. COIL A7NRES-T1370Y 450kHz | LI71010120 |
| XA01 | F | | SERAMVIB. CSA3.6MGF103 | FQ03604020 |
| | | | **PH04-HEAD PHONE JACK CIRCUIT BOARD** | |
| | | | **PH04-CAPACITORS** | |
| CH15 | | 4822 126 12496 | CER. 0.01µF +80%-20% 50V | DD38103010 |
| CH16 | | 4822 126 12496 | CER. 0.01µF +80%-20% 50V | DD38103010 |
| CH17 | | 4822 122 40617 | CER. 0.1µF +80%-20% 50V | DD38104010 |
| | | | **PB04-MISCELLANEOUS** | |
| JH01 | | 4822 265 11577 | JACK HEAD PHONE HS10914-01-040 | YJ01004500 |

| POS. NO | VERS. COLOR | PART NO. (FOR PCS) | DESCRIPTION | PART NO. (MJI) |
|---|---|---|---|---|
| | | | **PS04-SW ASSY CIRCUIT BOARD** | |
| SS01 | | 4822 276 14088 | TACT SW. ALPS-SKQUAA | SP01013280 |
| SS02 | | 4822 276 14088 | TACT SW. ALPS-SKQUAA | SP01013280 |
| | | | **PS14-SW ASSY CIRCUIT BOARD** | |
| SS11 | | 4822 276 14088 | TACT SW.ALPS-SKQUAA | SP01013280 |
| SS12 | | 4822 276 14088 | TACT SW.ALPS-SKQUAA | SP01013280 |
| | | | **PS54-IR ASSY C IRCUIT BOARD** | |
| CS51 | | 4822 126 10935 | ELECT 100µF 6.3V | EJ10700610 |
| QS51 | | 4822 130 11494 | PHOTO UNIT RPM6936-V4 IR SENSOR | HW10004210 |
| SS51 | | 4822 276 20508 | PUSH SW. EVQ11L05R | SP01013370 |
| | | | **PS64-DOOR SW ASSY CIRCUIT BOARD** | |
| SS61 | | 4822 276 20508 | PUSH SW. EVQ11L05R | SP01013370 |
| | | | **PU04-µ-COM ASSY CIRCUIT BOARD** | |
| | | | **PU04-CAPACITORS** | |
| CF22 | | 4822 126 11558 | CER. 0.1µF +80%-20% 50V | DA17104110 |
| CF49 | /2 | 4822 126 10408 | CER. 220pF ±10% B 50V | DA16221110 |
| CF50 | /2 | 4822 126 10408 | CER. 220pF ±10% B 50V | DA16221110 |
| CF51 | /2 | | CER. 1500pF ±20% X 50V | DA17152110 |
| CF53 | | 4822 124 21894 | ELECT 10µF 16V | EJ10601610 |
| CF54 | | 4822 124 21894 | ELECT 10µF 16V | EJ10601610 |
| CF55 | | 4822 126 10362 | CER. 22pF ±5% SL 50V | DA15220110 |
| CF56 | | 4822 126 10362 | CER. 22pF ±5% SL 50V | DA15220110 |
| CF57 | | 4822 124 21894 | ELECT 10µF 16V | EJ10601610 |
| CF58 | | 4822 124 21894 | ELECT 10µF 16V | EJ10601610 |
| CF59 | | 4822 124 23056 | ELECT 47µF 16V | EJ47601610 |
| CF60 | | 4822 122 40586 | CER. 0.01µF ±20% Y 50V | DA17103110 |
| CF61 | | 4822 122 40586 | CER. 0.01µF ±20% Y 50V | DA17103110 |
| CU01 | | 4822 126 10513 | CER. 47pF ±5% SL 50V | DA15470110 |
| CU02 | | 4822 126 10513 | CER. 47pF ±5% SL 50V | DA15470110 |
| CU03 | | 4822 126 10513 | CER. 47pF ±5% SL 50V | DA15470110 |
| CU04 | | 4822 126 10364 | CER. 100pF ±10% B 50V | DA16101110 |
| CU05 | /2 | 4822 126 10513 | CER. 47pF ±5% SL 50V | DA15470110 |
| CU08 | /2 | 4822 122 31237 | CER. 82pF ±5% CH 50V | DD15820300 |
| CU09 | /2 | 4822 122 31205 | CER. 47pF ±5% CH 50V | DD15470300 |
| CU10 | /2 | 4822 126 12496 | CER. 0.01µF DC50V +80 -20% | DD38103010 |
| CU11 | /2 | 4822 122 40617 | CER. 0.1µF DC50V +80 -20% | DD38104010 |
| CU12 | /2 | 4822 126 11071 | CER. 330pF ±10% B 50V | DA16331110 |
| CU13 | /2 | 4822 124 40786 | ELECT 2.2µF 50V | EJ22505010 |
| CU14 | /2 | 4822 126 10409 | CER. 560pF ±10% B 50V | DA16561110 |
| CU17 | | 4822 124 23295 | BIG ELECT 0.022µF 5V | EX22300510 |
| CU18 | | 4822 126 10935 | ELECT 100µF 6.3V | EJ10700610 |
| CU19 | | 4822 122 40586 | CER. 0.01µF ±20% 50V | DA17103110 |
| CU20 | | 4822 126 10935 | ELECT 100µF 6.3V | EJ10700610 |
| CU21 | | 4822 126 12867 | ELECT. 1000µF 6.3V | OA108006Q0 |
| CU24 | | 4822 122 40589 | CER. 0.047µF ±10% F 50V | DA17473110 |
| CU27 | | 4822 122 31823 | CER. 15pF ±5% CH 50V | DD15150300 |
| CU28 | | 4822 122 31823 | CER. 15pF ±5% CH 50V | DD15150300 |
| CU29 | | 4822 122 40617 | CER. 0.1µF +80%-20% 50V | DD38104010 |
| CU30 | | 4822 124 23053 | ELECT 1µF 50V | EJ10505010 |
| CU31 | | 4822 124 23053 | ELECT 1µF 50V | EJ10505010 |
| CU32 | | 4822 126 10408 | CER. 220pF ±10% B 50V | DA16221110 |
| CU33 | | 4822 122 33795 | CER. 4700pF ±20% X 50V | DA17472110 |
| CU34 | | 4822 126 10935 | ELECT 100µF 6.3V | EJ10700610 |
| CU35 | | 4822 122 40586 | CER. 0.01µF ±20% Y 50V | DA17103110 |
| CU36 | | 4822 124 22726 | ELECT 4.7µF 35V | EJ47503510 |
| CU37 | | 4822 124 22726 | ELECT 4.7µF 35V | EJ47503510 |
| CU38 | | 4822 122 40586 | CER. 0.01µF ±20% Y 50V | DA17103110 |
| CU39 | | 4822 122 40617 | CER. 0.1µF +80%-20% 50V | DD38104010 |
| CU41 | | 4822 126 10364 | CER. 100pF ±10% B 50V | DA16101110 |
| CU42 | | 4822 126 10364 | CER. 100pF ±10% B 50V | DA16101110 |

(VERS. :VERSION, U:U.S.A., F:JAPAN, K:FAR EAST, **:EUROPE)

| POS. NO | VERS. COLOR | PART NO. (FOR PCS) | DESCRIPTION | PART NO. (MJI) |
|---|---|---|---|---|
| CU43 | | 4822 126 10364 | CER. 100pF ±10% B 50V | DA16101110 |
| CU44 | | 4822 122 40586 | CER. 0.01µF ±20% Y 50V | DA17103110 |
| CU47 | | 4822 122 40586 | CER. 0.01µF ±20% Y 50V | DA17103110 |
| CU48 | /2 | | CER. 1500pF ±20% X 50V | DA17152110 |
| CU53 | | 4822 126 12867 | ELECT. 1000µF 6.3V | OA108006Q0 |
| CU54 | | 4822 122 40617 | CER. 0.1µF +80 -20% 50V DC | DD38104010 |
| CU55 | /2 | 4822 126 12496 | CER. 0.01µF +80 -20% DC50V | DD38103010 |
| CU56 | /2 | 4822 126 12496 | CER. 0.01µF +80 -20% DC50V | DD38103010 |
| CU57 | | 4822 122 40617 | CER. 0.1µF +80%-20% 50V | DD38104010 |
| CU58 | | 4822 122 40617 | CER. 0.1µF +80%-20% 50V | DD38104010 |
| CU59 | | 4822 124 40786 | ELECT 2.2µF 50V | EJ22505010 |
| CU61<br>∫<br>CU64 | | 4822 126 10408 | CER. 220P ±10% 50V | DA16221110 |
| CU65 | | 4822 122 40617 | CER. 0.1µF +80%-20% 50V | DD38104010 |
| | | | **PU04-CAPACITORS (COMMON)** | |
| C*** | | | PLASTIC FILM CAPACITOR<br>±5% 50V : [CU45 CU46 : KK U] | |
| | | | **PU04-RESISTORS** | |
| RU55 | | 4822 050 23308 | 3.3MΩ ±5% 1/6W | GD05335160 |
| RU57 | | 4822 050 23308 | 3.3MΩ ±5% 1/6W | GD05335160 |
| RU64 | | 4822 117 10158 | 1Ω 1/4W GG | GG05010140 |
| RU65 | | 4822 117 10158 | 1Ω 1/4W GG | GG05010140 |
| RU67 | | 4822 052 10101 | 100Ω ±5% 1/6W | GG05101160 |
| RU88 | | 4822 050 23308 | 3.3MΩ ±5% 1/6W | GD05335160 |
| | | | **PU04-RESISTORS (COMMON)** | |
| R*** | | | CARBON FILM FIXED RES.<br>±5% 1/6W : RF01-RF16<br>RF19-RF26 RF28-RF32<br>RF51-RF62 RT61-RT64<br>RU01-RU04<br>[RU05 RU07-RU12 : /2]<br>RU13-RU37 RU41-RU47 RU49<br>RU56 RU58-RU61<br>[RU62 : /2 U] [RU63 : /2 K KK]<br>RU69 RU71-RU74 RU76-RU87<br>RU89-RU93 RU98 RU99 | |
| | | | **PU04-SEMICONDUCTORS** | |
| DU01 | | 4822 130 80837 | DIODE HSS81TD 150V 150mA | HD20027010 |
| DU02 | | 4822 130 80837 | DIODE HSS81TD 150V 150mA | HD20027010 |
| DU03 | | 4822 130 80837 | DIODE HSS81TD 150V 150mA | HD20027010 |
| DU05 | | 4822 130 82421 | DIODE 1D3 1A 200V | HD20002710 |
| DU06 | | 4822 130 32362 | DIODE 1SS176 MA165 1SS254 30V 0.1A | HD20002000 |
| DU07 | | 4822 130 32362 | DIODE 1SS176 MA165 1SS254 30V 0.1A | HD20002000 |
| DU08 | | 4822 130 32362 | DIODE 1SS176 MA165 1SS254 30V 0.1A | HD20002000 |
| DU09 | | 4822 130 80837 | DIODE HSS81TD 150V 150mA | HD20027010 |
| DU10 | | 4822 130 80837 | DIODE HSS81TD 150V 150mA | HD20027010 |
| DU12 | | 4822 130 80837 | DIODE HSS81TD 150V 150mA | HD20027010 |
| DU13 | | 4822 130 80837 | DIODE HSS81TH 150V 150mA | HD20027010 |
| DU14 | | 4822 130 80837 | DIODE HSS81TD 150V 150mA | HD20027010 |
| DU15 | | 4822 130 11585 | L.E.D. SIM-22ST FOR DOOR | HI20001210 |
| QF51 | | 4822 209 83631 | IC NJM4558D-D | HC10008090 |
| QU01 | | 4822 130 11586 | PHOTO UNIT RPM-22PB PHOTO-DOOR | HW10006210 |
| QU02 | | 4822 130 91368 | PHOTO UNIT NJL5165KL DISC SENSOR | HW10004090 |
| QU03 | | 4822 130 42715 | TRS. 2SA1048 2SA933S 2SA1267 ETC. | HT10001000 |
| QU04 | | 4822 130 61892 | TRS. 2SD2144S U V | HT421442A0 |
| QU05 | /2 | 4822 130 41947 | TRS. 2SC2458 2SC1740S 2SC3199 ETC. | HT30001000 |
| QU06 | /2 | 4822 130 61227 | DIG.TRS. DTA114ES UN4111 10K 10K | BA10001000 |
| QU07 | /2 | 4822 209 17372 | IC SAA6588 RDS DECODER | HC10174490 |
| QU08 | | 4822 130 42715 | TRS. 2SA1048 2SA933S 2SA1267 ETC. | HT10001000 |
| QU09 | | 4822 130 42715 | TRS. 2SA1048 2SA933S 2SA1267 ETC. | HT10001000 |
| QU10 | | 4822 209 17376 | MICROPROCESSOR TMP87CS71F MR2020 E3E5 | HU298JT00F |
| QU14 | | 4822 130 42682 | DIG.TRS. DTA144ES UN4113 47K 47K | BA10002000 |
| QU16 | | 4822 130 41947 | TRS. 2SC2458 2SC1740S 2SC3199 ETC. | HT30001000 |
| QU17 | | 4822 130 42715 | TRS. 2SA1048 2SA933S 2SA1267 ETC. | HT10001000 |
| QU18 | | 4822 130 41947 | TRS. 2SC2458 2SC1740S 2SC3199 ETC. | HT30001000 |
| QU19 | | 4822 130 41947 | TRS. 2SC2458 2SC1740S 2SC3199 ETC | HT30001000 |
| QU20 | | 4822 130 42715 | TRS. 2SA1048 2SA933S 2SA1267 ETC. | HT10001000 |
| QU21 | | 4822 130 41947 | TRS. 2SC2458 2SC1740S 2SC3199 ETC. | HT30001000 |
| QU22 | | 4822 130 41947 | TRS. 2SC2458 2SC1740S 2SC3199 ETC. | HT30001000 |
| QU23 | | 4822 130 43313 | TRS. 2SC3312 2SC1740SLN | HT30002000 |
| QU24 | | 4822 130 43313 | TRS. 2SC3312 2SC1740SLN | HT30002000 |
| QU25 | | 4822 130 43313 | TRS. 2SC3312 2SC1740SLN | HT30002000 |
| QU26 | | 4822 130 42715 | TRS. 2SA1048 2SA933S 2SA1267 ETC | HT10001000 |
| QU29 | | 4822 130 41947 | TRS. 2SC2458 2SC1740S 2SC3199 ETC | HT30001000 |
| | | | **PU04-MISCELLANEOUS** | |
| LU01 | /2 | 4822 242 73843 | EMI FILTER 0.022µF | FM12223010 |
| LU02 | /2 | 4822 242 73843 | EMI FILTER 0.022µF | FM12223010 |
| SU01<br>∫<br>SU16 | | 4822 276 20508 | PUSH SW. EVQ11L05R | SP01013370 |
| VU01 | | 4822 135 00271 | DISPLAY UNIT FL 11-BT-164GK | HQ30806410 |
| XU01 | | 4822 242 72236 | CRYSTAL DT-38 32.768kHz | XO001001T2 |
| XU02 | | 4822 242 72066 | SERAMVIB. CST8.0MHz MT | FQ08004010 |
| XU03 | /2 | 4822 242 10857 | CRYSTAL 4.332MHz AT-49 | JX04003260 |
| | | | **PX04-SOUND CONT. H.P AMP CIRCUIT BOARD** | |
| | | | **PX04-CAPACITORS** | |
| CE09 | | 4822 124 22703 | ELECT. 0.22µF ±20% 50V | OA22405020 |
| CE10 | | 4822 124 22703 | ELECT. 0.22µF ±20% 50V | OA22405020 |
| CE11 | | 4822 124 22273 | ELECT. 0.47µF ±20% 50V | OA47405020 |
| CE12 | | 4822 124 22273 | ELECT. 0.47µF ±20% 50V | OA47405020 |
| CE17 | | 4822 122 40617 | CER. 0.1µF +80 -20% 50V DC | DD38104010 |
| CE18 | | 4822 124 41539 | ELECT. 47µF ±20% 16V RA-2 | OA47601620 |
| CE19 | | 4822 124 41539 | ELECT. 47µF ±20% 16V RA-2 | OA47601620 |
| CE20 | | 4822 124 90354 | ELECT. 100µF 16V | OA10701620 |
| CE21 | | 4822 124 90354 | ELECT. 100µF 16V | OA10701620 |
| CE27 | | 4822 121 42327 | FILM 470pF ±5% 50V | DF15471350 |
| CE28 | | 4822 121 42327 | FILM 470pF ±5% 50V | DF15471350 |
| CE31 | | 4822 121 42327 | FILM 470pF ±5% 50V | DF15471350 |
| CE32 | | 4822 121 42327 | FILM 470pF ±5% 50V | DF15471350 |
| CE35 | | 4822 124 41543 | ELECT. 1µF ±20% 50V RA-2 | OA10505020 |
| CE36 | | 4822 124 41543 | ELECT. 1µF ±20% 50V RA-2 | OA10505020 |
| CE37 | | 4822 121 42327 | FILM 470pF ±5% 50V | DF15471350 |
| CE38 | | 4822 121 42327 | FILM 470pF ±5% 50V | DF15471350 |
| CE41 | | 4822 121 42327 | FILM 470pF ±5% 50V | DF15471350 |
| CE42 | | 4822 121 42327 | FILM 470pF ±5% 50V | DF15471350 |
| CE45 | | 4822 122 30043 | CER. 0.01µF +80%-20% 50V | DK18103310 |
| CE46 | | 4822 122 40617 | CER. 0.1µF +80%-20% 50V | DD38104010 |

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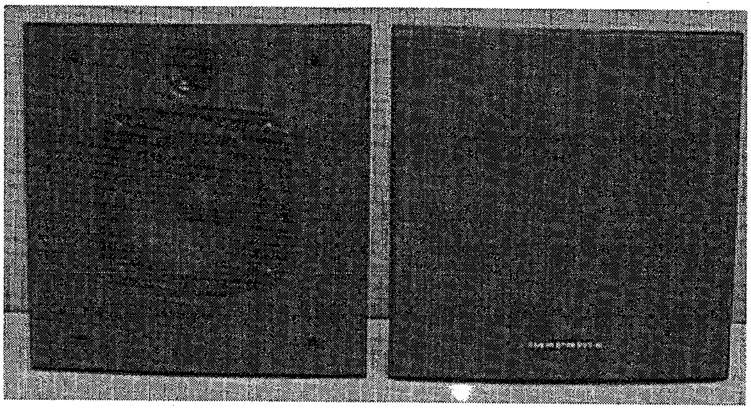
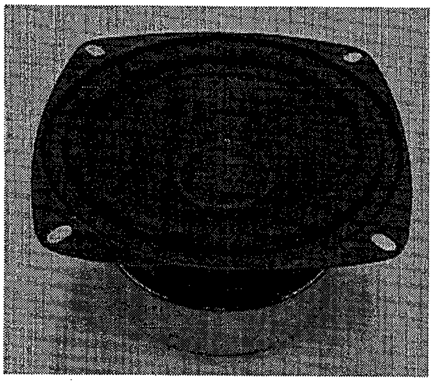
| POS. NO | VERS. COLOR | PART NO. (FOR PCS) | DESCRIPTION | PART NO. (MJI) |
|---|---|---|---|---|
| CH07 | | 5322 122 32143 | CER. 22pF ±5% 50V | DD15220300 |
| CH08 | | 5322 122 32143 | CER. 22pF ±5% 50V | DD15220300 |
| CH09 | | 4822 124 41539 | ELECT. 47μF ±20% 16V RA-2 | OA47601620 |
| CH10 | | 4822 124 41539 | ELECT. 47μF ±20% 16V RA-2 | OA47601620 |
| CH11 | | 4822 122 30043 | CER. 0.01μF +80%-20% 50V | DK18103310 |
| CH12 | | 4822 124 41539 | ELECT. 47μF ±20% 16V RA-2 | OA47601620 |
| CH18 | | 4822 124 41539 | ELECT. 47μF 16V | OA47601620 |
| CX01 | | 4822 124 90357 | ELECT. 2.2μF 50V | OA22505020 |
| CX02 | | 4822 124 90357 | ELECT. 2.2μF 50V | OA22505020 |
| CX05 | | 4822 122 30043 | CER. 0.01μF +80%-20% 50V | DK18103310 |
| CX08 | | 4822 124 41539 | ELECT. 47μF 16V RA-2 | OA47601620 |
| CX09 | | 4822 124 90352 | ELECT. 10μF 16V | OA10601620 |
| CX10 | | 4822 124 90352 | ELECT. 10μF 16V | OA10601620 |
| CX11 | | 4822 124 90357 | ELECT. 2.2μF 50V | OA22505020 |
| CX12 | | 4822 124 90357 | ELECT. 2.2μF 50V | OA22505020 |
| CX13 | | 4822 124 90352 | ELECT. 10μF 16V | OA10601620 |
| CX14 | | 4822 124 90352 | ELECT. 10μF 16V | OA10601620 |
| CX17 | | 4822 122 30043 | CER. 0.01μF +80%-20% 50V | DK18103310 |
| CX18 | | 4822 122 30043 | CER. 0.01μF +80%-20% 50V | DK18103310 |
| CX19 | | 4822 124 22273 | ELECT. 0.47μF ±20% 50V | OA47405020 |
| CX20 | | 4822 124 22273 | ELECT. 0.47μF ±20% 50V | OA47405020 |
| CX21 | | 4822 124 90357 | ELECT. 2.2μF 50V | OA22505020 |
| CX22 | | 4822 124 90357 | ELECT. 2.2μF 50V | OA22505020 |
| CX23 | | 5322 122 32143 | CER. 22pF ±5% CH 50V BLK | DD15220300 |
| CX24 | | 5322 122 32143 | CER. 22pF ±5% CH 50V BLK | DD15220300 |
| CX25 | | 4822 124 90357 | ELECT. 2.2μF ±20% 50V RA-2 | OA22505020 |
| CX26 | | 4822 124 90357 | ELECT. 2.2μF ±20% 50V RA-2 | OA22505020 |
| CX27 | | 4822 122 30043 | CER. 0.01μF +80%-20% 50V | DK18103310 |
| CX28 | | 4822 122 30043 | CER. 0.01μF +80%-20% 50V | DK18103310 |
| CX29 | | 4822 124 90352 | ELECT. 10μF 16V | OA10601620 |
| CX70 | | 4822 124 11574 | ELECT 1000μF 16V RE3 | EA10801670 |
| CX71 | | 4822 122 30043 | CER. 0.01μF +80%-20% 50V | DK18103310 |
| CX72 | | 4822 124 41539 | ELECT. 47μF 16V | OA47601620 |
| CX73 | | 4822 122 30043 | CER. 0.01μF +80%-20% 50V | DK18103310 |
| | | | **PX04-CAPACITORS (COMMON)** | |
| C*** | | | HIGH DIELECTRIC CONSTANT CER. CAPACITOR ±10% 50V : CE33 CE34 CE39 CE40 CH05 CH06 CH13 CH14 CX03 CX16 CX81 CX82 | |
| C*** | | | PLASTIC FILM CAPACITOR ±5% 50V : CE01-CE08 CE15 CD16 CE25 CE26 CE29 CE30 CE43 CE44 CE47 CH01-CH04 CX15 CX31 CX32 | |
| | | | **PX04-RESISTOR** | |
| RX72 | | 4822 111 90967 | FUSE 4.7Ω 1/4W | NF05047140 |
| | | | **PX04-RESISTORS (COMMON)** | |
| R*** | | | CARBON FILM FIXED RES. ±5% 1/6W : RE01-RE38 RH03-RH16 RN01-RN04 RX01-RX08 RX11-RX26 RX31-RX48 RX70 RX71 | |
| | | | **PX04-SEMICONDUCTORS** | |
| QE01 | | 4822 209 17382 | IC TEA6321 DSC | HC10170490 |
| QE02 | | 4822 130 61892 | TRS. 2SD2144S U V | HT421442A0 |
| QE03 | | 4822 209 83631 | IC NJM4558D-D | HC10008090 |
| QE04 | | 4822 209 83631 | IC NJM4558D-D | HC10008090 |
| QH01 | | 4822 209 82362 | IC NJM4556D | HC10016090 |
| QN01<br>≀<br>QN04 | | 4822 130 43818 | TRS. 2SC2878 A BRANK | HT328782A0 |
| QX01 | | 4822 209 83631 | IC NJM4558D-D | HC10008090 |
| QX02 | | 4822 209 83631 | IC NJM4558D-D | HC10008090 |

| POS. NO | VERS. COLOR | PART NO. (FOR PCS) | DESCRIPTION | PART NO. (MJI) |
|---|---|---|---|---|
| QX03 | | 4822 209 83631 | IC NJM4558D-D | HC10008090 |
| QX04 | | 4822 209 17381 | IC PQ05RF2 REQ.5V 2A | HC31905320 |
| QX05<br>≀<br>QX08 | | 4822 130 43818 | TRS. 2SC2878 A BRANK | HT328782A0 |
| QX09 | | 4822 209 83631 | IC NJM4558DD | HC10008090 |
| QX70 | | 4822 130 61892 | TRS. 2SD2144S U V | HT421442A0 |
| | | | **PX04-MISCELLANEOUS** | |
| LH01 | | 4822 157 62898 | CHOKE COIL 180μH J | LC11843800 |
| LH03 | | 4822 157 62898 | CHOKE COIL 180μH J | LC11843800 |
| LH05 | | 4822 157 62898 | CHOKE COIL 180μH J | LC11843800 |
| LX01 | | 4822 157 60122 | CHOKE COIL 4.7μH J | LC14723800 |
| | | | **PX54-AUX-IN MONI-OUT REMOTE CIRCUIT BOARD** | |
| | | | **PX54-CAPACITORS (COMMON)** | |
| C*** | | | HIGH DIELECTRIC CONSTANT CER. CAPACITOR ±10% 50V : CX51-CX55 | |
| | | | **PX54-RESISTORS (COMMON)** | |
| R*** | | | CARBON FILM FIXED RES. ±5% 1/6W : RX51-RX54 | |
| | | | **PX54-MISCELLANEOUS** | |
| JX51 | | 4822 265 11573 | TERMINAL MONI-OUT AUX-IN | YT02041230 |
| JX52 | | 4822 265 10684 | TERMINAL SUB WOOFER RCA-1PIN | YT02011020 |
| LX51<br>≀<br>LX55 | | 4822 157 62908 | CHOKE COIL 2.2μH J | LC12223800 |

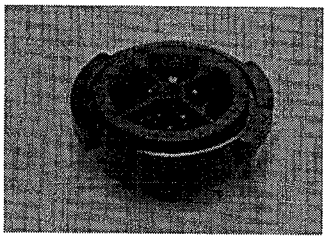
# Service Manual

## 74 LS2021 /9M
## LS2021 F,K,KK,U
## Speaker System

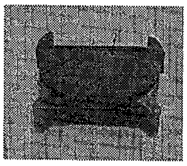




LS01



LS02



LS03

(VERS. :VERSION, U:U.S.A., F:JAPAN, K:FAR EAST, /X : EUROPE)

| POS. NO | VERS. COLOR | PART NO. (FOR PCS) | DESCRIPTION | PART NO. (MJI) |
|---|---|---|---|---|
| LS01 | | 4822 240 10354 | LOUDSPEAKER, TWEETER | *QK000030R |
| LS02 | | 4822 240 10355 | LOUDSPEAKER, WOOFER | *QK000040R |
| LS03 | | 4822 265 11569 | SPEAKER TERMINAL | *YT001430R |

Please use this service manual with referring to the user guide ( D.F.U. ) without fail.
修理の際は、必ず取扱説明書を準備し操作方法を確認の上作業を行ってください。

marantz®

# model LS2021

PCS 99 991